The Struggle to Scale: Keeping Up With the Internet

Abstract

The staggering pace of the internet's growth since the introduction of the first web browser in 1993 can be seen as the story of a struggle to scale. Set against the motivations of users, governments and businesses, the key moments in the internet's cultural, economic, political and social development demonstrate a varying ability to cope with its growth and consequences. Over the past twenty years we have witnessed a struggle to impose the frameworks of the old world — state control of borders and security, the unimpeded dominance of transnational corporations in the global marketplace — on the new landscape of the internet, where the potential for individuals to take control of their own destiny is, arguably, far greater than it has ever been. The outcomes of this struggle shape the internet that we use in our everyday lives, whether we are learning, consuming, sharing or protesting.

This paper evaluates seven significant milestones in the internet's development, and assesses what effect they had on reinforcing or diverting the interests and expectations of users, governments, and businesses. Each case study also considers the continuing relevance of some of the issues highlighted, recognising the current context, whereby increasing calls for internet regulation in the areas of access, security and commerce have potentially huge implications for the future direction of the internet. The article concludes with a discussion of some of the questions that those with a stake in the future of the internet should carry forward into its next twenty years.

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Introduction

In 2012, the internet is approaching near-ubiquity for a significant majority of citizens in developed nations. The proliferation of fast broadband has made viable the publishing, downloading, streaming and sharing of content from a range of providers, both established and less so. Cheap and accessible wireless and mobile data now let many of us take the web with us wherever we roam, making use of new location-aware innovations that further extend its reach and what we — and others — can do with it. Product and service platforms now channel and churn inordinate quantities of content and currency around the web: 60 hours of video uploaded to YouTube every minute, ~20 exabytes of data every seven days and an estimated $8 trillion dollar total value (Moore 2011; Thompson 2011; YouTube 2012). It is clear that, while there may be plenty of potential for debate regarding the various cultural, economic, political and social impacts, the internet has observed phenomenal growth over the period.

We've come a long way since that first email, that much is for certain. Despite the ever evolving and increasingly sophisticated threat posed by adware, spyware, and myriad other malware and viruses, and the reliability and regularity with which web-based businesses rise and fall, the internet has now achieved maturity in terms of end user trust and confidence. So trusted is it, that we now concede rights with alarming regularity, frequently skating past ream after ream of terms and conditions on our way to registering our acceptance of them, doing so in order to access various products and services that many of us now consider essential to our everyday lives: self-publishing our thoughts and details about our lives across broad social networks; uploading snapshots of special occasions; shopping for groceries; buying gifts; booking flights; taking online courses; researching a paper; or paying bills. Should we need to organise anything — a birthday party, a guerrilla gig, a flashmob, an occupation of a public space, or even a popular revolution — we will almost certainly use an internet-based resource at some point.

Alongside the swift transition of our day-to-day existence onto the web, there are other parts of society that have seized upon the enabling aspects of the technology to do something more than go shopping. The link between the internet and revolution has become more pronounced in the past two years and recent events in Moldova and Iran — swiftly characterised as the Twitter and Facebook revolutions — have clearly brought attention to the potential of the web as an enabler for the coordination and enaction of political protest. Similarly, the release of 250,000 U.S. embassy cables by WikiLeaks in early 2011 introduced many to the world of hackers and hacktivists, and in the months that followed collectives such as LulzSec and Anonymous were brought out of the shadows and into the public consciousness. Worries about the dark side of social media caused much hand-wringing in the wake of the U.K. riots in the summer of 2011, while even more recently, online tools have underpinned the global Occupy' movement that seeks to push back against governments and businesses seen by many as responsible for the current financial crisis. 2011 was a hell of a year for internet activists.

The ability of the internet to shine a light' on government activity is at the root of a rising tension between notions of transparency, freedom of access to information and government security. To assume that this is purely the preserve of traditionally repressive states would be a considerable mistake; those struggling with their newly evolving citizenry are often those same western nations who can frequently be spotted spreading democracy in other parts of the world. For

example, at the e-G8 summit in May 2011 former French President Nicholas Sarkozy declared that it was time to civilise the internet shortly after which the governments of China and Russia published a joint statement declaring that authority for internet-related public issues should remain the sovereign right of the nation state (Cellan-Jones 2011). This desire for more state-driven stability exposes a deeper worry on behalf of governments: that the empowerment of citizens one day will lead to a loss of government power or security the next. While the Arab Spring is a pertinent case in point, this concern also rises from the use of internet communications by criminal or terrorist groups, who are often invoked when new surveillance powers are suggested.

It is not just politicians who are looking for more control. The internet may now be a stable and safe enough place for consumers and a thriving platform for commerce, but it is still not the tightly regulated domain that many business leaders would have it be. Sensing an opportunity in the growing governmental preference for a more closely regulated internet, the major corporate players of the entertainment industry have had a busy two years. SOPA, PIPA, HADOPI, DEA, the Copyright (Infringing File Sharing) Amendment Bill.[1] Major pushes for legislation to curtail copyright infringement on the internet have been observed in the U.S., Europe and Australasia, and the U.S. Government has led the secretive ACTA (Anti-Counterfeiting Trade Agreement) process to its conclusion. All these efforts seek to impose strict consequences on internet users who illegally swap copyrighted files, and in certain cases could change copyright infringement from a civil offence into a criminal one. While it is unproven that new laws will actually change the way people use the internet, and despite popular protests against SOPA, PIPA and ACTA in early 2012, governments seem convinced that copyright infringement can only be solved through legislation.

The Struggle to Scale

The rapid development of the internet can also be seen as a story of a struggle to scale, to cope with the rapid pace of growth and its consequences. That it functions at all remains something of a minor technical miracle given that it runs atop a backbone of technologies, many of which were simply not designed to scale to their current levels, and is facilitated by a fragile collection of standards which are under almost constant attack, either from lamentable failures in implementation or from active efforts to undermine them for competitive advantage. Ubiquitous though it may be, it is arguably a rather fragile thing.

Beyond the often creaking technical infrastructure the challenges of scale are also evident in the legislative responses from governments. The internet's rapid growth is in part down to the model of openness that thrived in the first period of its existence. Eventually, this innovation pushed against existing interests. Initial responses from legislators attempted to simply stretch and contort existing legal frameworks to fit. The attitude appearing to be: that what *is* can be maintained, and that what *has* worked, can continue to work, if given sufficient powers of surveillance, policing and regulation.

We are now at something of a crunch point. As the internet has grown and we have passed well over 2 billion internet users worldwide, governments have attempted to balance the innovative tendencies of users and start-ups with the pleas of corporate players whose market positions are threatened by nimbler, hungrier businesses who have little use for business structures

[1] Acronyms explained: Stop Online Piracy Act (SOPA); Protect Intellectual Property Act (PIPA); Digital Economy Act (DEA); Haute Autorité pour la diffusion des œuvres et la protection des droits sur internet (HADOPI);

hemmed to trade frameworks based on set borders and agreements. In particular, the legacy entertainment industries continue their slow and steady decline due in no small part to their inability to re-imagine their existing business models, to properly recognise the changes that the internet demands, or to seize the opportunities it presents. Their strategy instead is to pressurise politicians to hold intermediaries liable for the problems of scale, and to push for regulation whereby internet service providers, search engines or even libraries would be responsible for policing their users' information-seeking activities, and users could have their internet connections slowed or even terminated for alleged copyright infringement.

In an age of terrorism, global crime networks and state-sponsored hacking, governments seem increasingly comfortable with the idea of closer surveillance of internet activity. Cybercrime legislation, filtering and online surveillance are all on the agenda of European Union countries and the United States (Halliday 2012a; Horten 2012; Zetter 2012). China and other countries have been censoring and monitoring the internet for years. The question is whether or not any actions taken by governments or businesses will achieve their end goals. The ease of hiding one's tracks online through alternate identities, proxy servers, virtual private networks (VPNs) or the backwaters of the Darknet such as Usenet groups, suggests that legislation designed to tackle any nefarious activity online is always going to be one step behind (Biddle *et al* 2002; Beckett 2009).

We are seeing a struggle to impose the frameworks of the old world — state control of borders and security, the unimpeded dominance of transnational corporations in the global marketplace — on the new landscape of the internet, where the potential for individuals to take control of their own destiny is far greater than it has ever been. How the internet is shaped is determined by the activities that occur in those interstices between end users, the state, and the corporate sector as each struggles to represent its interests and respond to the growth of the web and its various impacts.

By looking back at the period since the advent of the first mass-consumed browser, this paper evaluates significant milestones to determine what effect they had on reinforcing or diverting the interests and expectations of users, governments, and businesses, and to better understand how we got to where we are today. Can the internet fulfil the techno-utopian dream or will existing power structures be allowed to enforce regulations that will successfully preserve their interests before all else?

Scope of the Paper

This paper is concerned with the period following the introduction of the Mosaic web browser in 1993. By looking at the twenty years since, we shall be examining a period where what had once been the preserve of those in the know — the founding geeks, as it were — suddenly became available to the rest of us. During this time the World Wide Web, or web for short, became synonymous with the internet for the majority of its users: for most people the browser was the window to the internet. After all, how else was one supposed to navigate a new city, send emails, or find out where Kim Kardashian is?

This paper considers seven key moments in the development of the internet, and re-examines them to better understand where we are now, how we got here, and those questions we must consider as we move forward. The future development of the internet will be decided by many nations; but the values inherent in its underlying construction are almost entirely those of one nation alone. We are, in most cases, examining what is a U.S. story, with global implications. The majority of our case studies look at events that began in the Unites States and, even for

those that don't address U.S. interests directly, their influence can be observed in the development of the technologies used to implement internet surveillance and censorship, and the support for the nascent forces of resistance in regimes opposed to U.S. style democracy.

In each case we consider the roles played by, and implications for, users, governments, and businesses. The constant tussle and interplay between these three groups drives the development of the internet and the results of their interactions manifest themselves in everything from innovation to regulation. In the internet age users not only consume information they produce it, and the rules they play by in this regard bear little resemblance to those that existed before the Web went mainstream; just ask Metallica, the proprietors of the Pirate Bay, or Hosni Mubarak. Users now occupy multiple roles on the web, as producers, consumers, and activists.

The early years of the internet have often been described as a wild frontier, but in reality it didn't take governments long before attempting to impose some order on the online world. The extent to which they have been successful is still open to question: on the one hand, the closed internet societies of China or Iran, versus the more open networks of the netizens of the west on the other. The only sure thing is that the will to civilise the internet remains strong, as the recent remarks from the then French President do attest

As it did for governments, the speed of the internet's development post-Mosaic caught many large businesses flatfooted, and instead delivered the future to the nimble. The now established concept of the internet startup was entirely new in the mid-1990s. The success and massive growth of these startups turned several legacy industries on their heads, and the consequent competition between the old and new orders as they vie to deliver what users want, is now one of the most powerful forces driving the development of the internet and the legal frameworks that surround it. Picture all of the processes that led to entertainment giant Viacom suing Google's YouTube for copyright infringement, and you've got an idea of the tension between these actors (Glovin and Jeffrey, 2012).

Case Studies

Each of the selected case studies could quite easily have been supplemented or substituted by many others. Their selection is not by any means definitive, but they each highlight particular significant issues or trends in the history of the internet to this point.

- The impact of the NCSA Mosaic browser: why did it succeed where others had failed and with what implications for users, business and early internet governance.
- Trust and commerce online: the development of trust online, the rapid growth of e-commerce, the founding of Amazon and how they would come to define the character of business online.
- The search giant: how Google grew from a garage operation to an internet behemoth, unlocked the commercial power of big data, and the resultant implications for the web.
- The inherently disruptive internet: starting with Napster, how technology fostered a culture of sharing and innovation online that challenged the entertainment industry and the copyright system.
- Repression 2.0: in the shadow of the great Firewall of China, how governments are able to use internet technology to surveil and censor their citizens, and the alarming creep of information filtering and control.
- Everything is social: starting with MySpace, how social networking has redefined personal privacy on the internet.

- Re-evaluating the revolution: what can we learn from the so-called Twitter and Facebook revolutions, the changing relationship between social and traditional media, and the implications for participatory democracy.

Interrogating these historical episodes is not so much a hunt for answers as it is a search to uncover better questions, so that we might have a keener eye for the signposts as we progress through the next twenty years of the web.

Case #01 — The Impact of the NCSA Mosaic Browser

Today, the volume of traffic on the internet is a veritable torrent, churning constantly and at breakneck speed, but in the early 90's, it was "...a barely discernible trickle," (Gillies and Cailliau, 2000: 233). Though many of the core networking technologies that support the internet as we know it today had been in place since the mid-1980's, the introduction of IPV4 in 1983 extended the maximum possible number of IP address allocations allowing for a much larger network to develop. In 1983-4, Jon Postel's Domain Name System was instantiated. The TCP/IP network protocols, designed by Robert Kahn and Vinton Cerf circa 73-'74, were also at this time to emerge ahead of the competition (Appletalk, Xerox's XNS, DECNet, IBM's SNA), benefiting as they had from the advantages of an open specification, platform independence and the endorsement of the U.S. National Science Foundation (NSF) who, in 1986, adopted TCP/IP as the standard for the NSF network (NSFNet). Even so, it was not until Tim Berners-Lee's work at CERN had delivered the HTTP protocol and the first iteration of the HTML mark-up language, that all the necessary pieces fell into place.

Berners-Lee's work laid the foundations for the web as we know it and for every modern browser that would follow. At the time, there were a number of competing systems that already allowed users to access and publish networked resources, the most popular being anonymous FTP servers, but also Gopher and WAIS. Crucially, none of these provided any method whereby one could link from one piece of information within one document to another piece of information in another (Hardin and Schatz, 1994: 896). Berners-Lee's work on WWW aimed to do just this. In 1991, he described their experiments thus: "We have a prototype hypertext editor... a browser for line mode terminals which runs on almost anything... can access files either locally, NFS mounted, or via anonymous FTP. They can also go out using a simple protocol (HTTP) to a server which interprets some other data and returns equivalent hypertext files" (Berners-Lee, 1991). Initially, this "World Wide Web" browser only ran atop the expensive NeXT system, and the entirety of the web amounted to, well, "...primarily the CERN phone book." (Stewart, 1999)

It was Berners-Lee's determination to effectively open source the codebase which created the space for others to take the WWW browser concept and run with it. And run with it they did. In the next couple of years, a huge number of similar browsers emerged on different platforms, each bringing with them a number of extensions to Berners-Lee's original. While some chose to also support other networking protocols (gopher, FTP, NFS etc.), all aligned themselves to the emerging World Wide Web and HTTP/HTML.[2] The Erwise browser, developed at the Helsinki University of Technology, followed in April 1992 and was the first to include clickable hyperlinks and the loading of multiple documents (Holwerda, 2009) Despite such innovations, Erwise's fate was determined by the Finnish recession and a lack of investment support: "...the next step, to commercialize it, did not happen" (Tikka, 2009). From the University of California at Berkeley's Experimental Computing Facility came the ViolaWWW browser, which brought support for scripting and applets' but ultimately failed because it was only available on UNIX platforms. The Stanford Midas browser introduced the plugin' concept by allowing an external handler programme to read and display Postscript files inside the browser. The Samba browser was Robert Cailliau and Nicola Pellow's effort to bring the original CERN WWW browser to the Mac, but it struggled in terms of stability. This growing enthusiasm of developers for WWW and HTML was matched by an expansion in available content and the total number of servers online. This growth was in no small part due to the efforts of Tim Berners-Lee and those at CERN in working

[2] For a fuller account, Matthew Lasar's article, "Forgotten Web Browsers of the Early 90's" http://goo.gl/M3DwZ

the academic conference circuit in 90-'92 and evangelising about WWW. By the end of 92 there were an estimated fifty servers to access, most based in academic institutions (Gillies and Cailliau, 2000: 233). When the development team at Helsinki demoed Erwise for the first time, they estimated that the web had consisted of twelve sites and no more (Tikka, 2009).

Developed at the National Centre for Supercomputing Applications (NCSA) at the University of Illinois, Mosaic was launched in February 1993 and quickly eclipsed its contemporaries. The NCSA was one of four national supercomputing centres established and funded by the U.S. National Science Foundation, and which together formed NSFNet. NCSA's Joseph Hardin and Dave Thompson introduced some colleagues to the ViolaWWW browser and the content then currently available on the web, following a trip they had taken to CERN towards the end of 1992. Among them was Marc Andreessen who, having drafted in colleague Eric Bina to help, had by 23rd January 93 developed the 0.5 alpha version of Mosaic. Andreessen and Bina had built it over their Christmas holidays. Its impact was near immediate. Commenting in 94, Andreessen recounted how Mosaic had "...started with 12 users in early 93 for [the] initial alpha release, by mid 93 when things... started coming to people's attention we were in the hundreds of thousands of users" (in Systemseminartv.com 1994).

Mosaic brought a number of new features previously unseen in a browser. It was the first to add support for inline graphics, sound, and video; the inclusion of which gave rise to the phrase "hypermedia," (Hardin and Schatz, 1994: 895) and so began the journey from a text only web to rich multimedia platform. Mosaic also introduced bookmarking to aid user navigation, and provided a history feature by which users could retrace their steps. In addition it synthesised many of the innovations of those browsers that directly preceded it; about which, Andreessen was fairly brazen: "...we happily borrowed — *stole* — protocols, formats, code and so on from all kindsa different places" (in Systemseminartv.com, 1994). The inheritances from WWWbrowser, Erwise, Viola et al. were all clearly evident in the look, feel and behaviour of Mosaic.

The NCSA had a long held commitment to cross-platform releases for software they developed, and so held off on an official release until November that year. The availability of Mosaic on Unix, Windows, and Mac systems was a key factor in its success, giving it a far larger potential audience than previous single platform browsers, while also demonstrating the potential of HTTP and the web for facilitating information and communication between competing computer systems. It also had the major advantage of being the first browser that could be easily installed; Tim Berners-Lee commented of the initial alpha release, "...it installs very easily, as the binary is completely self-sufficient" (Berners-Lee, 1993). That the application dispensed with any convoluted resource packages, but was instead a single executable file made it far less intimidating for your average computer user. It was, "...simple to use, [and] insulated the user from unnecessary technical detail" (Thompson, 1994).

Understanding the appeal of the early web is perfectly distilled in Gary Wolf's Wired article of late 94, "*Why I Dig Mosaic*", wherein he details just how compulsive and immersive this new world of information could be, and why Mosaic proved to be such a compelling conduit. In it, he describes how Mosaic "...brought me in contact with information that I didn't know I wanted to know" (Wolfe, 1994) His journey begins with an attempt to verify some information on the CERN website, but he is quickly diverted via a poetry archive to a researcher's family homepage: "it was a type of voyeurism, yes, but it was less like peeking into a person's window and more like dropping in on a small seminar with a cloak of invisibility" (Wolfe, 1994). While it's not clear exactly how many copies of Mosaic were downloaded, the figure is thought to be around a million (Gillies and Cailliau, 2000: 241). The number of servers online at the point at which the alpha version was released had been fifty, but by October of 94 this had increased tenfold, and

by June the following year there were around 1500 (Wolfe, 1994) Within two years of Mosaic's alpha release the web went from 1.5% to 23.9% of all traffic on NSFNet. (Gray, 1996) The response was phenomenal: "...it took off like a rocket... nerds and neophytes alike were riveted to their computer screens" (Gillies and Cailliau, 2000: 236). Suddenly a whole other world had descended upon the previously cloistered academic networks.

Such rapid growth created a "...a combustible mixture of attention, power, money and politics" (Post, 2009: 150). Mosaic had been released to the web under generous licensing terms that played a major role in the pace and scale of its adoption. It was free for personal and academic use, with licenses only needing to be sought for use by commercial bodies. When Andreessen and Bina left NCSA in late 1993 to start up Mosaic Communications with SGI founder Jim Clark they retained this model for the release of Netscape Navigator. Marc Andreessen describes the model:

> "It's fairly straightforward, the only twist is that we're giving the client away, but that's under restricted conditions... free for basically personal, educational, single end-user use... deploying it within a corporate setting or redistributing it requires you to pay us." (in Systemseminartv.com, 1994)

Similar, free-at-point-of-use models have propelled some of the largest and most successful businesses on the web. Virtually every major search engine, every social network, every cloud-based collaboration and storage platform has achieved critical mass by — either initially, or in many cases perpetually — allowing free access to services; everyone from Facebook to Dropbox. Many have adopted ad-supported models or, alternatively, offer very limited free services such as low-capped storage or just the shell of a mobile application, in order to later upsell to paid services or content (Chen, 2012). Many of the struggles that we now contend with in terms of user privacy and data abuses undoubtedly stem from the ease with which we subscribe to — what appear to be — free services. To understand the true costs we are paying for these services is clearly difficult for users to divine. The implications of the complex skein of exchanges around access to services are forever up ahead of us and out of reach, while whatever signposts to them may reside in the present, are buried in lengthy contracts of legalese, and constructed in such a way that they are almost certain to remain unread by the people that need to understand them most. While these issues are discussed at greater length elsewhere, with respect to Google, it is clear that Mosaic has a part to play in this story, and that it was a defining moment in the establishment of user expectations about the web, and what it would cost them.

> *"...we had no sense that it was going to take off and simply monetize so quickly."*
> ***Joseph Hardin*** (Severance, 2009)

NCSA also licensed the technologies in Mosaic to a number of companies and insodoing sparked the commercialisation of browser software that would give rise to the browser wars of the late 90s (BBC, 1997) and which still continues today (Coldewey, 2011). Some licensees, like Spry, bundled up versions of Mosaic with other utilities, selling consumer focussed products that allowed people to quickly and easily connect to the web. Spyglass — NCSA's designated "master licenser" (Karpinski, 1995) — would themselves enter into a licensing agreement with Microsoft, who in turn would make use of Mosaic code in their internet Explorer browser, which would carry a credit to Mosaic as far as version 6, released in 2001.

Mosaic shipped with no security features whatsoever. The addition of a secure transfer protocol was absolutely essential for the development of commerce across the web, and this began to

be explored both by engineers at EIT and Marc Andreessen's Netscape. EIT developed the S-HTTP protocol and bundled this with a supporting version of Mosaic (*Secure Mosaic*) as part of their CommerceNet consulting services, while Netscape produced the competing SSL protocol, which eventually emerged as the standard. This represents the first instances of commercial ventures supplementing recognised standards as published by IETF, W3C, ECMA, ISO, IEC et al, and the first encounter in the continuing struggle to reconcile the drive to innovate for commercial and competitive advantage while maintaining the integrity and evolution of an open web.

Chris Wilson — one of the original NCSA development team and later of Spry — remarked at the time: "What essentially started out as a research project is turning into a commercial venture that a lot of people are jumping in on." (Karpinski, 1995) Perhaps most of all though, Mosaic brought users to the internet in sufficient numbers that businesses and advertisers began imagining it as a new and viable medium through which they could connect with customers. The first internet marketing conference took place in November 1994. Ken McCarthy anticipated the future of the internet thus: "when [it] really matures, the people that are gonna be on it the most — for better or worse — are people from Madison Avenue." (in Systemseminartv.com, 1994) Advertising embraced the internet wholeheartedly, to the detriment of traditional media advertising, such as TV and print.

Mosaic also prompted the first real crisis of internet governance. It is not a huge exaggeration to say that, for many years, the internet was in the hands of one man: Jon Postel. He personally maintained the original hosts.txt file — the index for where servers were on the network — first at UCLA and then University of Southern California's Information Sciences Institute. For years it was the case that if you wanted your site/server to be accessible on the network, you had to email Postel to request that it be added to the database; he would make the addition and send out an updated file (Post, 2009: 143). Postel was one of those behind the DNS standard, proposed in 1983. DNS allowed for increasingly complex and numerate domain names by introducing the nesting of names within domains (i.e. docs.google.com, where both docs' and Google' are nested second-level domains within the .com' top level domain), and proposed that the databases associating names and IPs be distributed across the network, rather than with a single host. In 1984 he founded the Internal Assigned Numbers Authority (IANA) that would allocate IP addresses and manage domain name allocations for the DNS. This work continued until 1992, when the National Science Foundation (NSF) made the decision to reallocate responsibility to a commercial firm, Washington DC based, Network Solutions Incorporated (NSI) (ICANN, 1993).

The NSF-NSI contract started in January 1993, the same time as the alpha release of Mosaic v0.5. DNS applications rose from ~200 per month in January 1993 to "...over 30,000 per month by late 1995, to more than 200,000 per month when the NSF-NSI contract expired in January 1998." (Post, 2009:150). Domain names quickly began to be traded as commodities, and in 1995 the NSF issued an extension of powers to NSI, that allowed them to charge USD100 for two years for a second level domain registration. The U.S. government had just created an effective monopoly by appointing a single U.S. based contractor as the sole issuing body for domain names worldwide. In 1997, NSI would be valued at just over a quarter of a billion dollars on the basis of its role in domain name registrations. This was just the first in a succession of controversies regarding U.S. influence over internet governance, that would continue through their mandating of ICANN — the non-profit that assumed responsibility for the DNS from NSI in 1998 — right up to the present day.

With its origins in two U.S. funded initiatives — ARPANET and NSFNet — it is perhaps no surprise that the U.S. government sought to retain a key position of influence over internet governance in the early years, but that that influence should be allowed to persist until well into the 2000s, as was the case, is perhaps more surprising. However, with the announcement of a new Affirmation of Commitments' in 2009 (ICANN, 2009), the U.S. DoC relationship with the Internet Corporation on Assigned Names and Numbers (ICANN) did finally change fundamentally, and a number of new boards with international oversight were established. The legacy of U.S. influence is still very apparent today, not just in the sheer volume of English language content on the web, but evidenced also by the fact that it was not until May 2010 that top-level domains existed in anything other than the Latin alphabet.

In its near-perfect aggregation and synthesis of features from existing browser efforts, cross-platform availability and easy installation, Mosaic brought users to the web in their hundreds of thousands, and in so doing, changed the entire landscape of the internet. No longer just the preserve of university professors and their students, the web began to be explored by an eager public, excited commercial interests, and a U.S. government that took the first steps in defining internet governance.

Case #02 – Trust and Commerce Online

There are few things in life that are guaranteed to cause as much worry as money. People need to feel safe when they spend it, safe that they are getting a good deal, safe that the money isn't wasted, safe that their credit card details aren't being scammed. People need to trust the monetary transactions that they are involved in, and without trust, commerce, in the shop or on the web, will not thrive. The eBay and Amazon story demonstrates how this trust was developed, and then embedded, in the online world.

In 2012, when we think of online commerce we think of Amazon, eBay, iTunes or any number of online stores selling anything from shoes to groceries. But purchasing possibilities outside of the High Street still existed prior to the internet, such as mail order catalogues or special offers in newspapers and journals that could be cut out, filled in and sent with a money order to buy x-ray specs or a set of royal wedding memorial plates. A certain trust had been established in the way payment systems were set up, with cheques and money orders being part of a recognised framework that as close to guaranteed something would turn up on your doorstep in the weeks following an order (whether the x-ray specs would work or not was another matter).

The spread of credit cards from the U.S. to Europe in the 1960s saw a new method of shopping come into the mainstream. Plastic credit cards required the establishment of trust on the part of both issuing banks and consumers. The familiarity bred by the purchasing of goods with plastic' and without cash was essential to the development of the online economy, as it was important that early adopters could quickly feel they were engaging with reputable businesses, in the same way as they could on the high street. People needed to feel that their details were safe (PBS 2004; Wang and Emurian 2004; Metzger 2009).

The development of SSL Encryption in 1994 delivered this safety and has remained essential to supporting trust in e-commerce ever since (Verisign 2010). In the beginning, the first businesses to recognise the trust issue went on to gain a stranglehold on the market. eBay, for example, was there at the beginning, and is still one of the most trusted internet brands today. From humble beginnings in 1995 through to 97 million active users and total assets of over USD27bn at the end of 2011 (eBay 2011; Locke 2011), it, more than any other site, showed that people wanted to partake in commerce online, they were comfortable selling and buying to/from strangers, and that very often they wanted to buy the strangest, most niche of items (Woyke 2011). With online payment processor PayPal standing beside eBay as a trusted partner and guardian of credit card details, plus a unique eBay rating system that allowed users to post feedback on both buyers and sellers, thus offering that all important trust factor, internet users felt freer than ever before in indulging their shopping needs online (Nielsen/NetRatings 2005).

Meanwhile, Jeffrey Bezos, a computer science graduate and entrepreneur from New Mexico had seen the future even prior to eBay. Bezos knew an opportunity when he saw one and he founded a company selling books online at a massive discount. This company, Amazon, quickly grew, taking advantage of a unique feature of the early World Wide Web — regulation of online commerce was in its infancy and a 1992 U.S. Supreme Court ruling prohibited a state from forcing a business to collect sales tax unless it had physical stores in that state (Poggi 2011). Amazon began trading in 1995 and today it is the world's leading e-commerce site with an established brand that makes it a first stop shop for online purchases. E-commerce itself was first popularised as a term in the mid-1990s, and once eBay and Amazon had taken it to the masses, online salesmen and women — and consumers — never looked back.

By the millennium, e-commerce had gone way beyond the selling of books. Larger consumer goods, such as televisions and stereos were on sale via Amazon and elsewhere by 1999, followed soon by property and automobile sales (Amazon 2011). At the same time, however, new thinking was needed to explain the ease with which the internet was satisfying more esoteric needs — Chris Anderson coined the term Long Tail' in 2004 to describe how even the strangest tastes could be catered for online, as previously hard to find goods and services started being offered by specialist sellers that previously might have languished in a back alley in Soho only selling second hand vinyl to the crowd that knew (Anderson 2004).

This clicks and mortar' moment, when offline stores embraced the possibilities offered by being online, marks the point when e-commerce became embedded in all business. Services — banking, insurance, travel agencies — had to have an online services division or become redundant in the face of competition. By the year 2000, fuelled by a surge in online adverts such as banner ads, online advertising in the U.S. was worth USD8.1bn and surfers could hardly move for commercials trying to sell us one thing or another (Evans 2009; Arandilla 2011). Traditional secondary businesses, such as transportation, were being revolutionised as a result of delivery activity — supermarkets even started offering home delivery options for groceries, proving that there really was no sector e-commerce couldn't touch (Tedeschi 2002; McKinnon 2003).

By the second decade of the 20th century there literally isn't anything you can't buy online. The online advertising industry — worth USD21.2bn in 2007 but USD55bn in 2010, and today largely dominated by the world's biggest search engine Google — drives us there with increasingly personalised ads (Evans 2009; Business Insights 2012). Gold. Diamonds. Babies (Associated Press 2009). Drugs (Reuters 2012). You can even get together with like-minded individuals through services like Groupon to drive the price down and get a better deal on your aerobics lessons or two-for-one pizza. What's more, you can do all of this on a mobile phone, through a never-ending stream of apps that making purchasing easier, quicker, trusted.

Aside from letting us get our hands on more stuff, far more easily, the real importance of the e-commerce explosion is the development of security and trust online. Payment processor PayPal, now wholly owned by eBay, has over 100 million users and reported revenue of over USD4bn in 2011 (PayPal 2012). E-commerce platforms such as Amazon and eBay are now almost part of the furniture of the World Wide Web. It's certainly difficult to imagine life without them, even if they are not yet 20 years old. And it's this familiarity that shows us another equally important outcome of e-commerce: it has created a new order, and new commercial giants that have caused chaos to established players and indeed threatened to turn the global economy on its head.

Existing businesses that dealt in easily digitised cultural products — music, movies, books — suffered badly from the advent of e-commerce. Giant record labels and music publishers, guardians of huge amounts of artists' rights and some of the best known songs of the 20th century utterly failed to manage the shift to a digital marketplace and were left watching as a technology company — Apple — developed the iTunes sales platform for digital music in 2003 and took a cut from every one of their online sales. The personalisation that new e-commerce platforms offered — wishlists and recommendations, or iTunes genius playlists — all contributed to the deepening loyalty to the new vendors. This is a key lesson from the story of e-commerce: sound business plans in the offline world don't necessarily translate to an online space where a more personal touch is expected. Furthermore, without a secure technology platform to offer one's goods, there will be a reliance on those who know how to operate in the new environment.

Once trust in online commerce had reached critical mass, consumer expectations began changing. When searching for digital goods such as music, immediate access was seen as essential or else users could turn to easily accessible illegal versions — prior to the launch of iTunes, illegal file-sharing Napster had over 20 million users (Jupiter Media 2001) Territory ceases to be an issue for the online sale of physical goods as well — or at least it should. eBay members may sell all over the world if they so choose, and Amazon delivers worldwide. There are no inherent technological restrictions on digital files being transferred globally either. However, copyright licensing issues and Digital Rights Management (DRM) create frustrating territorial and technical restrictions and it has become the natural reaction of some customers to start looking at easier alternatives. The rise of piracy is discussed in another case study later in this paper.

But if consumers had expectations about services, the market and its investors also had expectations too. The tremendous rise in e-commerce was not the only factor in the bursting of the dot-com bubble in 2000, but a factor it was (German 2012). Many new businesses attempted to get on that gravy train, and many were swept away in a flood of crushed hopes and wasted investment capital. Just as old business models needed new technology platforms to survive, a new technology platform alone was not going to be enough to keep a company's head above water. Just ask Webvan or Boo.com (Lanxon 2008). While the bursting of the bubble managed to bring more than a few people back down to earth however, the goldrush feeling hasn't quite gone away, and the idea that a new startup should monetise itself as soon as possible, with a medium-term view to a public stock offering, is still prevalent in the environment today (Salmon 2012; Halliday 2012b).

What is clear is that those who do make it to the IPO and are successful, like Amazon, or eBay, are embedding themselves further into many users' day to day internet experience — for example, in June 2011 one in five global internet users visited the Amazon site (Comscore 2011). In doing so, they are acting in similar ways to ambitious companies in the pre-internet age. Throughout its development, Amazon has been carefully diversifying, moving from the sales of books through to other goods, branching out in the digital sale of music and then employing its masterstroke, the development of the Amazon Kindle (Economist 2012). The Kindle, the world's most popular e-reader, allows Amazon to begin taking control of another part of the new information environment, by manufacturing and selling devices intended to host digital content that it is being sold….by Amazon. But there is more besides – in 2011 Amazon became a bona fide publisher with a stable of big name authors, all of whom will write for Amazon, and exclusively sell through Amazon in exchange for contracts that make their previous ones look positively 19th century. The world's biggest publishers, the so-called Big Six, have been gazumped (Streitfeld 2011).

Right now, the mainstream internet is being developed under the guidance of those who made it during the e-commerce boom, not those who were big in the days of analog. Although sales tax could soon be applied to Amazon and their competitors in the U.S., these new companies have taken their seat at the top table and are lobbying for preferential treatment to keep them there. The old guard will fight back, but it is unclear what they will be able to achieve. In this fight, consumers will trust those who give them what they want when they want. They don't want goods crippled by DRM, or territorial restrictions. In other words, they will trust those who have been most successful at reproducing a superior offline shopping experience, online.

It is internet users who have the most to gain from this situation. Once trust was established, users felt free to explore their niche interests online in a commercial sense, and to feel comfortable in their positions of instant access, wherever they are and on whatever device. This

freedom is crucial in understanding how users will react to the future stages of the internet's development — there will be no wish to go back to times of limited choice and scarcity. The level of participation and personalisation that e-commerce also gives the consumer must be considered, for it was eBay that gave users the option to be buyers and sellers (and Amazon that copied this system in its Marketplace offering), and to post feedback on their purchases (ditto). These feedback systems are now part of online life, and extend to all areas of internet activity.

There is another point to consider when looking at how e-commerce has affected user expectations online. As trust between consumers and vendors developed, consumers have shown themselves more than willing to give up personal information about themselves and their shopping habits, if they feel there is a return for them in this transaction. Amazon in particular has pioneered this approach to online shopping, and tries to direct consumers on to ever more purchases they might like' every time an item is purchased. Generally, consumers seem happy with this state of affairs, enjoying the serendipitous purchasing opportunities it offers, and trusting the internet giant not to abuse its position by making nefarious use of their data. This situation — comfort with an invasion of privacy in exchange for a good deal — is an important factor to take into account as we move forward to consider the future development of the internet.

Set against this, it is not clear how comfortable the majority of large pre-internet businesses are, particularly if they were in the business of selling content. If anything, the 18 years since the founding of eBay have seen big businesses struggle to scale when it comes to online commerce, never quite finding the Goldilocks business model for the internet age. Businesses whose product easily translates to zeros and ones, such as the legacy entertainment companies in the music and motion picture sectors, have struggled to move online, and Amazon's expansion has seemingly impacted on every other sector from white goods to office products.

But for those businesses that were savvy enough to keep up there is plenty to be cheerful about. The internet has provided a new frontier that keeps on giving, first by enabling startups to take advantage of previously inaccessible tax loopholes, then with its ability to enable them to sell a niche product, and finally by supporting a seemingly never-ending production line of new computers and mobile devices that can all be configured to sell us things in new, exciting ways. The bravest can even try the newest of business models, from the freeconomy to the type of social buying facilitated by Groupon and its ilk. Combine this with the attitudes of the modern, net-savvy consumer and it would seem that these businesses are likely to be feeling more comfortable than some of those in the recorded music or publishing industries.

Standing on the outside of this and looking in are, of course, the world's governments. With a traditional role in the modern capitalist economy as something of a hands-off regulator of business, governments have had to watch the development of e-commerce with what must be enthusiasm on the one hand and trepidation on the other. Clearly, anything that ploughs new energy into the commercial sector will be viewed as a good thing, but with large businesses, particularly those in the creative sectors, often very closely tied in with major political machines, there will also be forces mobilising in government that seek to protect the status quo — or at least give industry time to catch up and develop a viable business plan for the internet age, whenever that will be (Masnick 2012a).

Supporting start-ups is a great way for a government to show it cares about business on the internet. Getting to the point where a suitable legislative framework can be constructed to nurture new digital businesses is another thing however, particularly when there are high streets

to protect and established copyright-based content industries to consider. This is the conundrum that needs to be addressed, because finding a balance between the two will be difficult if not impossible. Perhaps the biggest struggle for governments going forward is to ensure that they have enough people working in policy development who actually understand the issues, and are able to make sensible decisions to benefit both vendors and users — without throwing the baby out with the bathwater.

Where are we now with e-commerce? It is here, it is established. Trust in online retailers exists, and there is no going back. Of course, the rise of Amazon, eBay and other e-tailers poses problems for the established, those who were there and powerful before online shopping and secure transactions became ubiquitous. This will undoubtedly be cause for concern for the boards of Sony BMG, or Harper Collins, but it won't matter much to the consumer. For they are the real winners in the story of e-commerce.

Case #03 — The Search Giant

Just recently, Business Insider published a graph detailing the recent, impressive growth of the search engine DuckDuckGo, under the title: "This Chart Should Have Google Worried." (Lynley, 2012) The subject of the story had just surpassed the landmark of satisfying more than a million search queries in a single day. By comparison, Google publicly confirms more than a billion, though this figure is widely thought to be conservative, with many estimating that it is actually closer to 3 billion (McGee, 2010). While the absolute numbers for both may not suggest that the two warrant any further comparison, what the article claims as significant is the recent pace of growth of DuckDuckGo, which is shown to be rapidly approaching the exponential.[3] This closely resembles the kind of growth curve that saw Google propelled to prominence and dominance in the search arena in the early 2000's.

In many respects, it resembles the early days of Google, and sports a similarly clean and uncluttered look to that offered by Mountain View, way back when. More than anything though, the service seems to have made significant gains by appealing to the anxieties of a growing number of internet users, concerned about data privacy. It deploys no cookies, stores no user data, and even integrates with the anonymising TOR network. It is hard to believe that an internet service's privacy policy might become its most touted feature and the principal factor in its adoption but this appears to be the case with DuckDuckGo.

For the user motivated more by the efficacy of the search methods employed rather than any concerns about data privacy, *dontbubble.us* highlights the filter bubble' effect (Pariser, 2011) that occurs when attempts are made to deliver personalised search results (Horling and Cullick, 2009) based on information collected from previous searches and activity on affiliate services. The argument goes like this: your behaviours and habits become self-reinforcing; your likes become stronger likes, your dislikes similarly so. Put simply, the web becomes rapidly smaller as you are served more of the same, to the point that it might even be harder for you to get at the information you really need.

The intention here is not to suggest that DuckDuckGo is somehow poised to unseat the dominant search provider from its long held position. After all, novel internet start-ups do nothing quite so much as come and go, and challengers to Google in search have thus far failed to make anything like a dint, included among them the ex-Googlers of Cuil.com (Wauters, 2008) and the giants of Redmond (Raphael, 2009). However, the appeal DuckDuckGo has for users is noteworthy because it is, currently at least, quite unique and it comes at a time when Google is facing increasing scrutiny from the U.S. Federal Trade Commission over its market position and what it does with users' data (Singhal, 2011). DuckDuckGo's growth, though modest in terms of absolute number, could indicate what might be the beginnings of a turn in user behaviour and, indeed, raises the question: can we reasonably envisage a widespread rejection of the rights-for-privileges trade-offs that have underpinned the free-at-point-of-access services that dominate the Web?

> "How do you search across the entire information space? I don't know. How do you know where you are and where you're going? Beats me!"

[3] The published stats are DuckDuckGo's own published traffic data (http://duckduckgo.com/traffic.html) and other services offer slightly different numbers..For further info compare against:
http://siteanalytics.compete.com/duckduckgo.com/
http://www.quantcast.com/duckduckgo.com
http://trends.google.com/websites?q=http%3A%2F%2Fwww.duckduckgo.com

Marc Andreessen, *NCSA Mosaic Developer* (Systemseminartv.com, 1994)

Though many now view the company motto, “Don’t Be Evil”, with a degree of scepticism, Google’s products and services have solved countless problems, first and foremost that of searching the web. Back in 1993, Mosaic was the catalyst that first brought people on to the web in huge numbers, and it did so by removing many of the practical obstacles that existed to getting on and navigating the web. It was clear though, that many difficulties still remained. The most glaring of these was the means of navigation and orientation among such a rapidly growing network of linked resources. The internet was growing at a rate of ~100% per year (Coffman and Odlyzko, 1998), and Mosaic provided no search functionality to help users make sense of it. There quickly sprang up a number of services that hoped to provide users with a convenient starting point when navigating the web. The range of search services grew to include offerings from companies such as AltaVista, AskJeeves, Excite, HotBot, InfoSeek, and Yahoo, among others. With the exception of InfoSeek — which launched with a pay-per-search model that was quickly abandoned — all adopted some form of advertising supported business model; be it contextual, appearing alongside search results, or paid inclusion, where for a fee companies could have their products woven into the results returned by a site’s web crawler.

In beginning their experiments with PageRank and BackRub — respectively, the key ranking algorithm and early name for the service that was to become Google — Sergey Brin and Larry Page were at pains to differentiate themselves from the ad-supported majority and keen to highlight the potential threats such arrangements posed for the integrity of search. In their Stanford research paper, “The Anatomy of Search”, the pair detail the broad architecture for Google search and reveal the combination of PageRank link analysis, link text analysis and location information that would allow them to substantially improve the quality of returned results comparative to existing search engines, and which would see users swarming to the service in their droves. Tucked away in the appendices of the paper, the pair make quite clear their views on the state of web search at the time, stating that the “... goals of the advertising business model do not always correspond to providing quality search to users...” and that any “...advertising funded search engines will be inherently biased.” (Brin and Page, 1998)

The Google Beta launched in early 1998 and, once it had fully emerged from under the Stanford wing, it adopted a sparse visual aesthetic: a front page with nothing more than the site logo, a search bar and button and, crucially, no ads. It continued in this vein, and grew quickly; astonishingly quickly. Despite indexing far less of the web than its competitors, Google attracted people because of the increased relevance of the results it was able to return. By the autumn of 1998 Google was satisfying tens of thousands of search queries daily (Auletta, 2010: 45) by early 1999 this had reached half a million (Auletta, 2010: 61). Google made a loss for years though, and even after rounds of venture capital investment and the appointment of Eric Schmidt as CEO, questions were being asked about how Google could monetise itself. When quizzed in 1999, Brin quipped to the interviewer: “Leslie, have you visited our online t-shirt store?” (Walker, 1999) While Google was successfully partnering with the likes of Yahoo!, Red Hat and Netscape to provide search services, it had still to prove itself financially. That it was able to float in 2004 with an astonishing valuation of USD23bn at USD85 per share, regarded by many as undervaluing the company,[4] was almost entirely as a result of “...an accidental discovery, two years after the company’s founding, that plain text advertisements on its search results pages produce enormous profits.” (Stross, 2008: 2-3)

[4] Dropping the starting share price was a concession made to the SEC in light of comments made by Page and Brin in an interview with Playboy magazine, in which they revealed information that it was claimed contravened certain restrictions of the SEC’s I.P.O procedures. See: http://www.economist.com/node/3103916

Google originally introduced AdWords in October 2000, in modest fashion, with 350 advertisers. These were basic text ads displayed alongside search results. There were no images for fear this would impact on page load times. One of the core appeals of the service was not just the relevance of results, but the speed with which it returned them and so ads were restricted to a small portion of dedicated screen real estate. What about inherent bias'? Ads and search remained separate, or at least separate enough to satisfy the Google pair's misgivings about ad-supported search. Brin and Page insisted upon ads being relevant to search, and this resulted in ads appearing in no more than 15 percent of searches (Auletta, 2010: 63). More accurately then, it was not on the basis of no advertising that Google differentiated itself, but on the basis of ad relevance and no paid inclusion. In their 2004 SEC IPO filings the company declared: "We will live up to our "don't be evil" principle by keeping user trust and not accepting payment for search results" (SEC, 2004). The revenues AdWords generated, though undoubtedly helpful, were initially somewhat unremarkable and did little to quell the questions about the firm's long-term financial viability (Hansell, 2002). When Google migrated from a cost-per-thousand to cost-per-click model in February 2002, AdWords was relaunched and reborn, and the potential of Google's relevance matching ads to user search terms was finally unleashed. Advertising would become Google's only significant source of revenue. To this day it represents over 95 percent of the company's turnover.

Regardless of how it was leveraging user data, in 2002 there was little cause for Google, or anyone else for that matter, to be unduly concerned about user privacy. It was, after all, not necessary to log into Google services to make use of them and, regardless of the introduction of ads and the expansion of services (language localisation, WAP content, emailing search results), it had a single core product: search. Stross recounts the unfortunate example of Urs Hölzle — now Senior V.P. for Technical Infrastructure at Google — who when quizzed about user privacy responded that user concerns were "...a little bit less of an issue than, let's say, if you had an email service" (Stross, 2008: 38). A year later, Google would launch its GMail service.

If you can match user search terms to relevant advertisements and bring the two together in the blink of an eye, you were an advertiser's dream. When you told them you could target ads based on the contents of private emails? Even better! In terms of building a complete user profile, sometime Google consultant and then Chairman of the Board of the Electronic Frontier Foundation Brad Templeton summed it up thus: "My e-mail contains the story of my life, and what's not in there is often recorded in my searches" (Templeton, n.d.). The offer to users was an initial 1GB of free email storage, which already far eclipsed competitor offerings, with a promise that it would continue to incrementally increase available storage such that users never had to worry about deleting emails. That the service actually launched without the ability to delete emails was, for many, a paradigm shift too far. For all Google's insistence that users should forget about managing their mail and just relax in the knowledge that messages would always be there and could be easily retrieved with all the relevance and accuracy they had come to expect from the company's web searches, to many this was disconcerting. It was the combination of both this and ads being delivered based on email content that were at the core of public privacy concerns on the launch of GMail in 2003. The technology that would bring ads to GMail — semantic search — was deemed to be so potent a discovery that it was actually deployed independently, before GMail was even launched. AdSense, was a new advertising product launched in 2003 that allowed Google to extend its power to place relevant ads to the whole of the internet, turning the Web into "...a giant Google billboard" (Graham, 2007).

Since then, Google has quickly gone from being a search company to a just-about-everything company and there has been growing user concern and media attention regarding what it does with the incomprehensible amount of data it is able to harvest and store.[5] Google's reach has extended almost immeasurably: providing free access to satellite imagery from around the globe; mapping our streets and the sea floors in 3D; extending what was thought possible with web technologies by offering a whole suite of browser-based productivity tools GoogleDocs; hosting blogs, websites and photo galleries; digitising books; indexing our home computers via Google Desktop (now discontinued); making a play for our home computers with Chrome OS and our mobiles with Android; and, not content with consistently being the number one destination on the Web or providing search directly from within many existing browsers, it has its own in Google Chrome. It has used its significant capital base to make numerous acquisitions; in 2011 it was reckoned to be one every other week (Manjoo, 2012). Among them, the big ticket purchases, such as: KeyHole, DoubleClick, YouTube, On2, Feedburner, ITA, AdMob, Android and Motorola (Rosoff, 2011). Still retaining clear dominance in the search engine space, hovering around 90 percent of market share (StatCounter, 2011), it rather begs the question both for Google and us as users — how much is enough?

Is Google becoming, as one commentator remarked, "...that kid who brings an M-80 to the neighbourhood (sic) barbecue. While everyone else is goofing off with sparklers, Google blows up a trash can and freaks out the entire block"? (Agger, 2007) In his 2012 update to investors as CEO, following the departure of Schmidt in April 2011, Larry Page remarks that "...over time, our emerging high-usage products will likely generate significant new revenue streams for Google as well as for our partners..." (Page, 2012) In the next breath, however, the example to which he turns is… mobile advertising. For all its years of dominance, all of the wonderful services it has brought to the Web, Google is caught in a cycle where information collection and analysis brings in advertising revenue and creates value for shareholders. It must continue to feed the algorithm in ever-greater quantities, with more varied and detailed information, about us.

Google, at times, has perhaps not helped its own case with some of its pronouncements. Eric Schmidt has certainly produced some choice soundbites. (Pegoraro, 2011) In an interview at the Washington Ideas Forum, he remarked that Google policy "...on a lot of things is to get right up to the creepy line and not cross it." (Jerome, 2010) A bizarre thing to have said but, regardless, there'd be few that would contest it: Google has got awfully close to that creepy line on a number of occasions. It has discomfited users by crawling emails to target ads; it has upset publishers, authors, and archives with its shoot-first-ask-questions later approach to book digitisation; it has captured burning buildings (J-walkblog.com, 2008) and dead bodies (Selleck, 2010) on Street View; it publicly disclosed users' GMail contacts via its, now discontinued, social network, Buzz; (McMillan, 2008) and its recent U.K. advertising campaign, "That's the Plus", seemingly encourages parents to store as much as possible of their children's lives on Google servers. (O'Reilly, 2012)

At the close of 2011 Google found itself the subject of a Senate judiciary committee hearing (U.S. Senate, 2011) to determine whether it was using its huge dominance in internet search to unfairly promote its other products and services. (Senate, 2011) Noteworthy were Eric Schmidt's comments to the committee on the pace with which Google modifies its search algorithms: roughly every twelve hours. The Google Books episode clearly demonstrated that a company "...with ample funding and a willingness to defend its copy-first-delete-later policy in

[5] A calendar year survey of the Nexis U.K. newspaper database for major world newspapers shows a rise in coverage from 36 stories in 2003 to a peak of 1237 in 2010 (wherein the term privacy occurs at least once and where Google occurs >3 times). To 5 April 2012 there are 389 such stories.

court... was going to move far more quickly than a loose confederation of companies like the OCA [Open Content Alliance].." (Stross, 2008: 105) that opposed it. Among other examples of similarly nimble manoeuvring, Google was charged by the FTC in March 2011 for deceptive privacy practices relating to the rollout of the Google Buzz social network (FTC, 2011) and shut it down in October. (Horowitz, 2011) It launched the Google+ platform in its place with a limited trial in June of 2011 (Gundotra, 2011), but almost instantly attracted widespread criticism over its attendant real-names policy (McCracken, 2011), not to the extent that it prompted another FTC investigation but, even so. It sometimes feels as though our governments are hanging on for dear life, while the technology giants, like Google, place ever more strain on the leash.

Certain questions also must be raised regarding the close relationship between Google and the U.S. government: how compromised is the U.S. government in passing legislation affecting a company upon whom it is increasingly reliant for critical government services? In 2005, when Google acquired Keyhole and the technology upon which Google Earth would be based, they were buying a firm funded by In-Q-Tel, the CIA's for-profit investment arm (Morozov, 2011: 236). Google would later supply servers and search technologies for the CIA *Intellipedia* intelligence gathering site, (Glazowski, 2008) and in 2010 In-Q-Tel and Google would jointly invest in social media monitoring firm, Recorded Future. (Mills, 2010) Google has itself been the beneficiary of NSA expertise, in order to shore itself up against cyber attacks that occurred on its servers in 2010 (Nakashima, 2010). Now, close relations between technology companies and governments are certainly nothing new, but perhaps the economic importance, the financial clout, the extent of influence and commercial appetite of this new generation of internet giants — of which Google is perhaps the most prominent, but which might also include Amazon, Apple, eBay, Facebook — does, in fact, problematise these relationships in hitherto unforeseen ways. If any one of them is allowed to become so integral to our economies, our societies, that we simply can't do without them, at that point then, who is calling the shots?

Early 2012 saw an absolute furore over the changes and unifying of Google's various privacy policies which, depending on your viewpoint, was either an improvement to its services or one more step towards the creepy line? Or maybe both? And there's the rub... Google weren't the only ones either. 2011 seemed to be the year when almost every other week there was some new Facebook privacy scandal. They were also charged by the FTC in 2011 for user privacy violations (FTC, 2011) Comparing Facebook and Google may seem like apples and oranges in some respects, with the former strictly a social network and the other, well, these days just-about-everything, but they do share a significant common property: they both make their money from targeted advertising, based on information gleaned from users. It would seem though, that users are waking up, getting wise and are starting to take their privacy ever more seriously: the anonymising TOR expanded from a mere 32 relays in May 2004 to 1500 by October 2009 and continues to grow (Loesing, 2010); browser plug-ins preventing behaviour tracking by third parties, such as Ghostery, Ad-Block Plus, and DoNotTrack have seen rising popularity; and DuckDuckGo has come to market, differentiating itself primarily on the basis of the information it *doesn't* hold about its users.

In terms of other rival technology giants, Apple and Google have long tussled on the stock market, back and forth, edging one another out in terms of market capitalisation and price per share. The two are both hugely successful but they are markedly different in both culture and aspect. Apple famously does no market research, it trusts in the firm to hire, nurture and retain the creative and engineering talent required to bring to market products that people will buy. It is in many respects the opposite of Google, in so much as it is not in the business of giving anything away for free, or even wanting to appear to be. Apple makes attractive, premium-priced products that famously just work and has been very successful in selling people a

complementary eco-system of hardware, software and content. They successfully reintroduced the walled-garden concept for music, TV and film downloads with iTunes and iPod, and have extended this further with the tightly controlled applications marketplace that provides iOS device users with access to games and utilities, many of which function as windows to the web. Apple has extended the same App Store concept to its desktop OS and others, observing the success, have followed suit: Blackberry App World, Nokia's Ovi store, Windows Marketplace for mobile, and Redmond will now be bringing the app store concept to the next version of its Windows desktop OS.

Amazon have followed suit, making their own play for some of that alluring eco-system dollar, and have migrated from being a marketplace to providing a — very Apple-like, it has to be said — end-to-end media consumption experience, all based around its original core business: books. When the Amazon Kindle was announced in 2007, it was not the first e-reader to hit the market, and nor did it significantly out-spec any of its competitors. What Jeff Bezos got right was the eco-system integration, Apple-style. This was heralded as the beginning of Books2.0. (Levy, 2007) The user experience was central, books bought on Amazon would sync wirelessly and effortlessly to your Kindle via the Whispersync service but, better yet, you could buy directly from the device, and with both wi-fi and contractless 3G versions, Bezos was onto a winner. The service included not only books, but also newspapers, magazines, and blogs, with the added benefit of being able to side-load documents in the popular .pdf format (Kindle 2nd Gen onwards). Leap forward to 2012 and Kindle has become a full blown e-books ecosystem: you finish reading your Kindle on the morning commute, pick up where you left-off in your web browser over lunch, squeeze a few pages in on your smartphone when you should be listening to what's going on in that meeting you're in. Beyond that, Amazon has also had runaway success providing a platform for self-publishing. (Pilkington, 2012) With the announcement of the Kindle Fire heralding Amazon's entry into the Apple-dominated tablet market, it is perhaps little surprise to find out that they are considering expanding the successful Amazon content eco-system to include original Amazon TV programmes. (Kafka, 2012)

The renaissance of the walled-garden is a concern to many who care deeply about the web. The criticism is often raised that the app culture of iOS and Android, and the closed shopfront of the Kindle or iTunes stores, exist to the detriment of the web and that walled gardens lock information away in a manner that isn't searchable or shareable, and that this runs counter to some of the web's founding principles. In terms of users, at least, all the time that Apple, Amazon and others like them, are primarily using these eco-systems as drivers for selling actual physical product, like Kindle Fire or iPad,[6] then it really doesn't hurt for those companies to let you know where the walls are. They are selling you a particular experience, and users make a choice. For Google, though, who must continue to deliver more effective targeted advertising to satisfy its partners and investors, there are clear incentives in making us think there are no walls.

[6] Apple have experimented with advertising via iAds, though thus far not on anything like the scale of Google.

Case #04 – The Inherently Disruptive Internet

It is doubtful that Shawn Fanning ever dreamt of derailing an entire cultural industry when he was a little boy. Nevertheless, the knock-on effects of the software he developed at the age of 18, designed to help him and his friends share digital music files more easily, can be argued to have done just that. Within two years of its 1999 release Napster had over 26 million users and at its peak they were sharing over 80 million songs (Jupiter Media 2001). By 2011 the Recording Industry Association of America (RIAA) estimated that they had lost a staggering USD55bn in revenue over the previous decade, and their explanation for this was simple: the advent of peer-to-peer (P2P) file sharing (Arista el al 2011)[7].

Fanning didn't invent P2P; others got there before him. However, by applying it to one of teenagers' and young adults' most cherished cultural products — music — his invention managed to take the concept into the mainstream and alert tens of millions of internet users to the possibility of getting free media over the internet. By doing so Napster, and the copycat clones it spawned such as Gnutella, Kazaa, Limewire, and Grokster, almost immediately broke the stranglehold that major record companies had on the distribution of recorded music and alerted users, musicians, entrepreneurs and lawyers that the established ways of doing business on the internet were in for a change.

These services also placed a gigantic nail in the coffin of analog-era copyright. Significant lawsuits in the past decade have made it clear that by offering access to copyrighted files the services provided by Napster et al were illegal (Giblin 2011). They were closed down and huge fines were levied; but putting the genie back in the bottle has since proved impossible. Thanks to the ease of digital copying, illegal digital versions of music and movies continue to be distributed all over the internet. And yet, even before the representatives of the major music labels or the movie studios, such as the RIAA or Movie Picture Association of America (MPAA), expanded their legal campaigns to essentially bludgeon the practice to death in U.S. courts by suing individual internet users — their own customers! — members of the global file-sharing community produced by Napster had begun developing alternative means to share files and avoid detection. A new means of sharing called BitTorrent had been developed by Bram Cohen in 2001 and it would soon spread even further around the world than the original P2P services. Additionally, new forms of cloud-based file storage websites called cyberlockers sprang up, offering access to digital files for free and premium rates. By January 2012, when Megaupload boss Kim Dotcom was arrested in New Zealand, large amounts of money were being made from what courts all over the world clearly saw as copyright infringement (Kravets 2012).

In hindsight, the recording industry's choice to pushback against the inevitability of file sharing seems shortsighted. Their campaigns against users in the courts, including verdicts that initially levied charges of USD222,000k per infringing file against Jamie Thomas, or USD22,500k per file against Joel Tenenbaum, served only to demonise them as money-grabbing corporates with no connection to culture, and no hesitancy in suing members of public who no doubt were also their customers (Haller 2006; Johnston 2011). In setting out to make an example of individuals they drew attention to their own behaviour regarding artists, and in the process made it easier for people to justify their online sharing (Masnick 2011a; WinstonTPB 2012). Furthermore, they failed to understand the potential of new internet technologies for their businesses, with the end result being that a technology company, Apple, which stepped into the breach and founded an

[7] Copyright math however, being a source of some debate: http://blog.ted.com/2012/03/20/the-numbers-behind-the-copyright-math/

online platform where digital music, books and movies could be purchased legally, taking a substantial cut from the major entertainment corporations while doing so.

While it might seem harsh, it is instructive to note how badly the incumbent players in the entertainment industry called this wrong. As with other new technologies, such as the VCR, instead of trying to adapt their initial response was to try to shut things down and attempt to maintain the status quo (Barro 2012). The legality of MP3 players was questioned (Johnson 2012). When that didn't work music files were only made available with digital rights management (DRM) embedded that restricted what users could do with their files and which devices they could play them on. If you were an unlucky Sony customer, you might have bought a CD that installed a hidden rootkit on your computer to monitor your activities (Schneier 2005). These mistakes are glaring in 2012, but the underlying truth is that industry executives have continually tried to turn the clock back rather than adapt to the internet.

In the past decade more and more legal services have appeared and begun to prosper. Apple's iTunes remains the market leader but all types of music are now available to buy online, legally. Streaming services, such as Spotify, have also emerged, and countless startups, from Soundcloud to Mixcloud to Turntable.fm have given music fans a chance to create and share their sounds with others. As time has passed, and economists have realised that the sky is not falling for these industries, and that people continue to spend roughly the same amount of money on entertainment, just spread over a wider range of formats, sales of digital media have begun to slowly increase as people explore more innovative ways to connect with fans (Karaganis 2012; Sanchez 2012; Masnick 2012b).

The innovative ability of those who understand internet technology is therefore not in doubt; but neither is the continuing desire of the established entertainment industry to shape the legislative environment in which these activities take place in. Copyright is key to this situation — music, movies and publishing are industries that use business models based around the collection and exploitation of rights. Simple digital reproduction of media files disrupts these models or even makes them obsolete and the post-Napster years have seen new attempts to tackle this through far-reaching legislation. Putting aside for a moment the activities of copyright trolls such as Righthaven or ACS:Law, suing individual users is no longer the weapon of choice (Cammaerts and Meng 2011). Instead, the RIAA and MPPA have influenced policymakers to go after intermediaries, such as search engines or social media sites, drafting and promoting legislation that seeks to criminalise online copyright infringement and even, ultimately, cut off repeat infringers' access to the internet[8]. Under such legislation other intermediaries caught in the middle, such as hotels, cafes, pubs universities or libraries, could be held liable for the activities of their users (Dutton 2010).

13 years after Napster appeared on the scene the central issue at stake — the extent to which culture can be shared, changed and then shared again online — has gone from being the preserve of those with the technical know-how to download and install P2P software to those who know how to use Google. Copyright legislation, which was once a fairly stuffy legal interest, has motivated thousands of people to take to the streets in protest against ACTA in Eastern

[8] Such as the Stop Online Piracy Act (SOPA)/Protect IP Act (PIPA) in the U.S., the Haute Autorité pour la diffusion des œuvres et la protection des droits sur internet (HADOPI) in France, the Digital Economy Act (DEA) in the U.K., or clandestine free trade agreements such as the Anti-Counterfeiting Trade Agreement (ACTA), or the Trans Pacific Partnership (TPP).

Europe, or one of the world's best known websites, Wikipedia, to black itself out for a day in protest against SOPA/PIPA (Fightforthefuture.org 2012; Lee 2012).

The story of Napster is one of a struggle to scale on behalf of the established media industries. The shift to digital left the major record labels behind but then, strangely, the movie industries and now the publishing industries have failed to learn from their mistakes. Instead these industries have consistently failed to provide services that give consumers what they want, at an appropriate price and free of restrictions. The major record labels' initial insistence on DRM, eventually abandoned by 2009, was at the root of an internet arms race with hackers and crackers that continues to this day in relation to the online offerings of movie studios and publishers. Users cannot stand this.

It is no coincidence that the world's biggest social network, Facebook, is built on the human urge to share information with each other (Sengupta 2011). The successful media startups of the post-Napster period have embraced this and turned to users themselves to become the stars of the show. Building upon the social innovation connected with file sharing, crowdsourcing, remixing, and the creative responses to DRM and online surveillance has resounded with internet users. The old model of one distributor hoarding content, then turning on a tap to allow an unreleased box set or rare b-side to dribble of it out now and again entirely on their terms, is completely redundant in the face of Tivo, Spotify, or Hulu. Unbundling is now de rigeur.

However, the companies that have taken advantage of technical expertise and creative thinking have continually banged their heads on a legislative ceiling that is outdated and clunky. What has become clearer post-Napster is that copyright frameworks at national and international levels are woefully unable to deal with the explosion of creativity and sharing that the internet has created. The extension of copyright term in the U.S. and Europe in the 1990s has come to be seen as beneficial only to corporate interests, and nothing to do with the promotion of culture and creativity at all (Lessig 2002). Legitimate uses of copyrighted material, such as making personal backup copies, are restricted by DRM, or exceptions to copyright are trumped by licenses (British Library 2010). The development of Napster et al is significant because the behaviour of corporate players who feel their control slipping away has consistently shown them to be only concerned with the bottom line.

This may be one of the most important things to monitor in this debate. The sense of fear that pervades the cultural industries, despite the continued profits to be made in this sector, may lead to overreach. In the case of the proposed SOPA/PIPA legislation, for example, this overreach took the form of a proposal that would mandate the blocking of websites and interference in the internet DNS system (McCullagh 2011). Under such a proposal the underlying architecture of the internet would be altered to protect the established entertainment industry's business models. Connected to overreach is the issue of unrealistic demands placed on intermediaries. For example, Viacom asking Google to monitor all content posted on YouTube for copyright infringement, or photographers requesting diligent search for the rightsholder for every item included in a mass digitisation programme (Gibault 2012). The extent to which policymakers are being influenced by the existing creative industries is a cause for concern, and is increasingly countered by those who understand the internet's development since Napster.

Another view, however, is that the lessons of the past fifteen years tell us that without a change to this system...not much will change. Circumventing DRM on media files or hiding one's file sharing activities via an anonymising service is relatively easy to do if someone shows you how

(or if you look it up on Google). Criminalising copyright infringement, penalising intermediaries to the extent that they restrict services, or cutting people off from the internet – these will all affect internet users but they will not make the issue of online piracy go away. Instead they will drive it underground to darknets and into contact with the even more worrying types of content that live down there (Beckett 2009).

In some ways, therefore, it is users who have the key to this situation in their hands. The exchange of media files on the internet adheres to the market forces of supply and demand, and if music and movies and books are not being made available in a timely manner and reasonable price users will go elsewhere. Fifteen years of seeing user-driven technology consistently outpace platforms that established industries are comfortable with will also have an effect on the way users will view the situation. There is a general awareness that the change proposed by incumbents will be gradual if not glacial — something that is not attractive to users who have grown up with an attitude that favours instant and low cost to free access. There is a generational gap to consider in this aspect of the internet's growth, and the fact that so many of the protestors against ACTA and SOPA/PIPA were under 30 should give some indication of how future generations will see the situation.

For younger internet users are not stupid. It is clear that reports of the death of the music industry have once again been exaggerated. Home taping did not kill music, and neither will the internet (Goldacre 2009). For the cultural industries though, gloom has been the order of the day, and there has been a sense since the advent of Napster that the giant media companies have dragged their feet all the way to the internet age and failed to engage with the technology in a realistic and positive way. Their thunder has been stolen by smaller, more nimble businesses and their attempts to seize the narrative back have been hamstrung by their decisions to turn on their own customers and game the legislative system in their favour.

It might be thought that national governments would have stood back from this situation and let the market sort it out. However, this has not been the case, and since the birth of the web copyright legislation has been repeatedly proposed which favours incumbent copyright holders and actively disrupts a system that is supposed to balance the interests of creators and users (Council of the European Communities 1993; Gifford 1999). Big media itself is often behind this legislation, and pushes it forward through well-funded supporters in government (Lessig 2002). In a country like the United States, the entertainment industries are a major contributor to the political machine, and normally they expect to receive something in exchange for their donations (Masnick 2012a). In the 1990s the U.S. government gave it to them; post SOPA/PIPA it may become more difficult to satisfy their wants.

Presently, more governments have begun to consider copyright reform[9] and, while these efforts may yet flounder on the rocks of industry lobbying, if there is some progress in this area it may help to counterbalance the work being done on increasing copyright enforcement through trade agreements like ACTA and TPP. The question of whether to nurture and support new digital industries or protect and shepherd the old ones into the 21st century is going to be difficult for internet-age governments to answer. The way that they do will have a great effect on whether users continue to engage with the mainstream internet or whether they will turn their backs and go underground.

[9] Reviews of copyright legislation have recently been undertaken in Australia, Canada, France, Ireland and the United Kingdom

Right now is a crucial point. The internet's architecture has scaled perfectly in terms of the framework needed to support mass sharing of information, but the legal frameworks to guide this sharing have failed almost completely. Put simply, the question now is whether real-world consumption of digital media by internet users will drive the future frameworks for content distribution, or whether the established entertainment industries will be able to maintain their role as gatekeepers of content in the digital age. Governments will have to decide which horse to back, or continue to find the tricky third way — which will almost certainly be outpaced by technological advances. Whatever the result, something will become a collateral casualty: the old ways of content creation, distribution and payment, or the flexibility of the internet's structure itself.

Case #05 – Repression 2.0

When the great techno-utopian dreams of the late 20th and early 21st centuries are reviewed in years to come, the theme of the internet delivering unrestricted access to information for all might well be remembered as something of an idealistic fantasy (Barlow 1996). While we may just be experiencing a blip on the way to this tremendous outcome for all, internet-enabled utopia has yet to materialise for the majority of the world's citizens with most of those online finding their movements scrutinized and logged by governments and businesses in a way that wasn't even possible, or thought about in the late 1990s.

Back then, the major growth in internet users was happening in the world's developed regions: the U.S. and Europe. China, for example, only had 22 million users in 2000 (Internet World Stats 2011a), and internet penetration across the Middle-East was less than 2% (Internet World Stats 2011b). The surge in internet access in the U.S. and Europe fuelled a corresponding surge in innovation and internet start-ups, many of which (Hotmail, AltaVista, Yahoo) focused on facilitating communications and access to information. Governments less inclined to letting citizens drive such things were able to take advantage of slower internet development in their regions to build a network they were comfortable with, only encouraging people to go online when they were ready. By that time, an architecture of filtering and surveillance was installed in the infrastructure that continues to exist today.

The most famous of these network architectures is often referred to as the Great Firewall of China (Walton 2001). Started in 1999, this gigantic surveillance edifice tracks communications and blocks Chinese citizens' access to websites, chatrooms, mailing lists or other online resources that could be harmful to morals or incite subversion (August 2007). It does this through a sophisticated filtering system that builds on over a decade of advances in the area of blacklists and whitelists, keyword filtering and DNS blocking. It also helps that it allegedly employs around 30,000 people to engage in real-time surveillance of chatrooms and messaging services (Waters 2008).

The scale of China's surveillance apparatus is difficult to replicate, but the technology behind it isn't (Villasenor 2011). Since the beginning of the World Wide Web IT companies, particularly western ones, have been willing to sell equipment and expertise to governments like China's, and filtering/monitoring systems have been installed at national levels in Saudi Arabia and other Gulf States (OWNI/Wikileaks 2011). Elsewhere, countries like Cuba, North Korea or Myanmar have built their own intranets for selected citizens to access, forbidding connection to the internet that westerners take for granted. Pakistan even put an ad in the newspaper for help with their surveillance system (Sutton 2012).

While the resulting censorship and curtailment of online freedom has drawn the well-meaning attention of human rights groups and, more recently, the U.S. Department of State, western governments have over time become more used to the idea of what is going on in the non-democratic countries of the world. While not endorsing internet censorship per se, there seems to have been an acceptance on the part of western governments that some degree of filtering is acceptable. This acceptance starts with idea that there is undoubtedly some heinous illegal activity taking place online — child pornography for example. Internet blacklists that seek to prevent access to this material exist in Scandinavia, and several pieces of legislation have been passed in the U.S. (Hamilton 2004; OpenNet Initiative 2010). The U.K. has considered requiring users to opt-in' to pornographic material when taking out a contract with an ISP (BBC 2012).

It is possible to be against child pornography and the blacklisting of websites — such a crude technique has caused numerous cases of blocking access to legitimate websites (EDRI 2012). Yet despite protests by internet freedom groups, it still seems to be popular with policymakers as a solution to the problem. This is important, because the idea that some online activity is so awful that governments have a moral obligation to filter or monitor it is key to the success of other, apparently unrelated legislation such as the raft of anti-terror laws that were rolled out around the world in the wake of the 9/11 terrorist attacks in the U.S.. Any side effects that result from this moral obligation aren't important and mentioning them is unpatriotic — what is important is that something is being done.

In the U.S., for example, the USA PATRIOT Act[10] has normalised state surveillance of the internet in the name of national security. The 9/11 hijackers supposedly used public library computers in Florida, which led U.S. lawmakers to believe that records of who uses what machines, where and when, needed to be kept (Manjoo 2001).The national security excuse has always been present in China's explanation for its internet censorship, but following 9/11 it became possible for western governments to raise the spectre of terrorism to institute wide-ranging surveillance and data retention policies that have a net effect of casting every internet user as a potential criminal (Hamilton 2004). Rapid developments in technology make the possibility of monitoring all citizens' electronic communications far more feasible than in the pre-internet age.

Of course, with new technologies come new ways of avoiding them, and a struggle between the watched and the watchers began in earnest after 2001. The TOR network, anonymising proxy servers and virtual private networks (VPNs) all have become more popular with individuals in recent years. User privacy is becoming a mainstream issue, particularly since it is not just governments that wish to know what users are doing online. The rise of internet giants such as Amazon, Google, or Facebook is based entirely on understanding the behaviour of their users, and then tailoring advertising directly to them to sell more products. Furthermore, the willingness of people to embrace social media has led to a tremendous increase in the amount of personal information available online, the consequences of which only really began to go mainstream in 2012, when the policies and practices of internet companies began to be revealed as playing fast and loose with the concept of individual privacy (Mills 2012).

This last development is crucial, because it shows that people are finally coming to realise the extent to which their every move is tracked online. If there is a certain inevitability to governments seeking to monitor the activities of their populations in a hopefully good-faith effort to provide only the best-tailored services and security in the internet age, the idea that we are being pursued ever more intensely by commercial companies who wish to turn our every click into profit seems to rankle more (Honan 2012).

Looking at the broader picture and regarding access to new markets on the internet, it should be clear that we cannot depend on corporates to save us from government surveillance. While it would be nice to think that Google closed its Chinese mainland operations because of a humanitarian or ethical objection to requests from the Chinese government to censor its search results, in reality Google withdrew because, as Sergey Brin has admitted in rather clinical fashion, "On a business level, that decision to censor... was a net negative." (Martinson 2007).

[10] AKA the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism' Act of 2001

It's not in the interest of giant internet companies to give up their users' information to security agencies but nor is it easy for them to avoid being in the position to be asked. Faced with enemies who are increasingly sophisticated in their use of online communications, Governments' desire for backdoor access to the huge banks of personal information held by companies such as Google or Facebook is increasing. In the U.S. a proposed extension of the Communications Assistance to Law Enforcement Act (CALEA) could authorise FBI access to information from all services that enable communications' — expanding in one go wiretapping possibilities from telecommunications carriers to email providers, instant messaging services, social media platforms and peer-to-peer technologies like Skype (Savage 2010). In Europe, the U.K. government has proposed to resurrect previously abandoned plans for a real-time surveillance network that could access individuals' social media accounts (Katz 2012). For both of these proposals to get off of the ground countless social media platforms will have to co-operate with governments and provide access to their customers' information to an unprecedented degree. They can most certainly be expected to fight it — it's a risk they would rather not take for fear that it would lead to a huge loss of users, popularity, and ultimately profit.

The rising profile of privacy issues is one of the most important developments in the recent history of the internet. However, despite the ostensible efforts being put into resolving the issues on the commercial side through things such as do-not-track legislation in the U.S., or the Right to be Forgotten in the EU there is no guarantee that the world's governments are going to stop interfering with information flow online anytime soon (IP-Watch 2011; Bright 2012). There is a very real market for surveillance technologies that can help governments, and an appetite among them to explore the possibilities this technology offers (York and Timm 2012). While the issue of popular revolution is dealt with in more detail in another case study in this paper, it is unquestionable that western governments, for all their public support of the Arab Spring, don't want anything like this happening on their doorstep. Witness the U.K. government's reaction to rioting in the summer of 2011, when the idea of turning off social media and instant messaging services was briefly mooted (BBC 2011).

Many in the U.K. found the government's suggestion laughable, considering the freedom of the internet in the country, but it is unlikely to be funny to those who used social media in the failed Green Revolution in Iran. The important thing about the development of censorship and surveillance on the internet is that it *is* possible and it is happening, and that techno-utopianism is powerless in the face of the police turning up at one's door after a throwaway tweet expressing frustration at an airport delay (BBC 2010). The very reality of governments' ability to restrict entire populations' access to information is key to understanding any future development of the internet. Those who need to access or communicate information, no matter what it is, will want to do so. If this information is of a sensitive kind, access and dissemination of it may be restricted. Who comes out on top is down to the technologies either side has access to — and this leads to a type of face off. Behaviour considered unacceptable, whether that is illegal pornography, or the co-ordinates of an anti-government protest, is driven further underground, where better tools are needed to access/neutralise it. With non-democratic governments unlikely to open up their internets in the near future, and with democratic ones happy to use the real — and occasionally not so real — threats to national security to ensure that their data retention and surveillance options are kept open, this one will run and run.

Seen from the perspective of most internet users, it could be said that censorship and intrusion of privacy is only really a problem when it happens to you. In the first ten years of the World Wide Web, it is a fair bet that the vast majority of users on the internet held little fears that their movements were being scrutinized, or that information was being denied to them. Users had to

play with what was in front of them and in the west that meant an unrestricted web, while in Cuba it meant a restricted intranet, if you were lucky.

As time has gone on, however, a combination of factors, all of them underpinned by increasing internet penetration across the planet, has raised people's awareness of both censorship and surveillance. In fact, many of the issues examined in this paper's case studies — the rise of e-commerce; the increasing use of social media; the risks inherent in illegal file-sharing; and the role of the internet in popular revolution — have drawn attention to the fact that not everyone's internet experience is equal. Some people on the planet are more likely to receive poorer quality information than others. Some groups purporting to represent the masses, such as WikiLeaks, Anonymous or LulzSec, have made it a raison d'etre to draw attention to the lack of transparency in society in general, and in doing so they have drawn attention to a lot of the parties involved in trying to stifle information flow, or pressure others to do so.

WikiLeaks may be most famous for its expose of U.S. government cables, but neither it nor groups of hackers like Telecomix have spared the business sector from the hard glare of publicity when it comes to their role in facilitating censorship and surveillance (Greenberg 2011). Even on the ground in Iran, government opponents found the time to call out Nokia/Siemens for the technology they sold to the Iranian government that let them monitor calls and track activists (Dehghan 2009). Cisco, Nortel, Blue Coat — all of these companies have been involved at some point in the sale of network technologies to repressive regimes (OWNI/Wikileaks 2011). The role that surveillance plays in keeping Google or Facebook at the top of the internet tree has already been pointed out. In terms of the future development of the internet, the role of the market means that there will always be room for unscrupulous companies, which almost certainly means that the business sector is not going to be the actor that ushers in the age that techno-utopians dream of.

One advantage the business sector has is that governments are either complicit in, or clueless about, the situation. The desire to control populations existed long before the internet, particularly in non-democratic societies, and internet technology is merely the latest in a number of methods that have been previously employed. However, the internet offers governments like China the opportunity to put down central hub points through which all communications traffic passes, at the same time as also offering it a gigantic propaganda opportunity that can fill the gaps in peoples' lives where information is missing. An online orthodoxy can be created and, in terms of future internet development, it will be difficult to turn back the clock. Developments in Myanmar will be watched with interest.

The establishment of orthodoxy is backed up by the ability to target individuals, whether they are criminal or just subversive. When governments deem the retention of power so important as to reject democracy, the opportunities offered by internet frameworks set up to control information and root out subversives is too tempting to ignore. Speeches made by the U.S. State Department in 2011, or by representatives of the European Union, verge on hypocrisy in this regard, for in one breath the need for a free internet is extolled, while in the next calls are made to combat online copyright infringement through increased traffic monitoring on networks (US Department Of State 2011). As activists in Scandinavia understand, a system that starts out trying to combat access to one thing — child pornography — can, in only a handful of years, experience mission creep and be commandeered to block other types of information altogether. And not in a transparent manner.

We are now at the point where control mechanisms are embedded in the internet's architecture. These mechanisms are exploited in government policy, and in business policy too. Users almost

certainly expect to be monitored in some way, perhaps by companies in the west, or by the government in non-democratic regimes. This is key, because it means that there will be pushback and attempts, no matter how small, to live the techno-utopian dream. The question of censorship still can be considered in the context of the famous John Gilmour quote: that the internet “interprets censorship as damage and routes around it” (Elmer-Dewitt 1993). The control mechanisms can be avoided, but the stakes will continue to rise in the race for the mouse to stay ahead of the cat.

Case #06 — Everything is Social

In January 2012 Rupert Murdoch tweeted that, with MySpace, NewsCorp had "...screwed up in every way possible..." (Abell, 2012) NewsCorp had bought MySpace for ~USD580m in 2005 when, though still young and unproven, it was experiencing unprecedented growth for a site of its kind: a social network. In July 2008, 41.4 billion pages were viewed on MySpace, which, at the time, made it the site with the largest number of page views within the United States. (Angwin, 2009: 9) Three years later, in 2011, NewsCorp sold MySpace for an undisclosed sum, widely reported to be ~USD35m (Segall, 2011). At less than a tenth of what they paid for it, this represented a considerable loss and was a remarkable closing chapter in the rise and fall of what was — if neither the first nor the most successful — arguably the most significant of the social networks. While Facebook may be reigning champion in the social networking space today, there is a huge amount about our current position and trajectory that can be understood by looking at its one-time rival.

From 2003 there was increasing public and press attention given to what was seen then as the new *trend* of social networking. There were various early attempts at social networks — Tribe, Orkut, Ryze, Tickle — the most successful being Friendster, conceived by ex-Netscape developer Jonathan Abrams, as a dating site with a difference. Instead of matching strangers on questionnaire responses, Friendster took on the rather simpler task of giving you a way to meet people through mutual friends. The thinking was that connections rooted in real-world relationships would be viewed as safer and the service would be more trusted as result. It would also introduce the key architectural trait of all social networks to this day: the ability to create a personal profile page and to selectively link it to those of others. Quickly adopted by the 20-30s dating demographic, Friendster launched in early 2003 and attracted 4 million users within its first nine months. Its users swiftly demonstrated behaviours atypical of your average dating site: some using the site to reconnect with old school friends, while others "...treated it as a giant parlour game to see who's connected to the most people." (Spinner, 2003) It also demonstrated social stratification, quickly generating a shadowy marketplace for access to more exclusive Friendster circles, with invitations to select groups being auctioned off on eBay. (Kahney, 2003)

Such was the site's rapid rise in popularity that Jonathan Abrams had appeared on TV talk shows, (Rivlin, 2006) secured some USD13m in investment from venture capital firms, and turned down a USD30m offer for the firm from Google within a year of its launch (Hopkins, 2003). Perhaps even more surprising than how quickly it grew, though, is just how quickly it was eclipsed.[11] As a dating-site, the Friendster approach "...focused on fostering safety and trust." (Rosenbush, 2005) Users were required to use their real identities and those found to be generating fake or obviously fraudulent profiles were quickly deleted. While acceptable to many, this irked a proportion of users, giving rise to the now infamous *Fakester Manifesto* (Unknown, 2003). It is testament to the pace with which users were testing the boundaries of this new networked environment that by July of 2003, with the service having only launched in March, Friendster was dealing with its first user-rights revolt. Such grumblings also didn't go unnoticed among the wider Friendster community, with many users choosing to seek out alternatives, and by one member in particular: Tom Anderson.

Having first met while both working at XDrive, by September 2002 Tom Anderson and Chris DeWolfe had sold their fledgling start-up, ResponseBase, to eUniverse (later Intermix) for USD3.2m. eUniverse was not held in particularly high regard, responsible as it was for various

[11] The company would later in 2006, successfully be awarded a significant patent related to social networking sites, but even this could not restore the competitive advantage it had by then lost to MySpace.

“pop-up advertising, unsolicited emails, spyware and the adware behind controversial peer-to-peer file sharing network Kazaa” (Lapinski, 2006). They were a company that held a diverse portfolio of low-brow products and services, and who had a knack for knowing exactly “...which viral greetings cards with fart jokes on them were really gonna hit it big.” (Angwin, as quoted in Snyder, 2009)

By the following summer, eUniverse were struggling financially, having been kicked off the Nasdaq stock exchange following accounting irregularities, and were in need of new ideas to lift the company’s prospects. Around this time, Anderson approached DeWolfe enthusing about Friendster. Following a few days spent intensely surveilling the site, the pair had conceived a plan. They would create a functional copy, brand it, and use the marketing clout of eUniverse to make it a success. Within a matter of weeks, MySpace was up and running. They would stick with the copy-paste approach as they developed the service. Anderson would routinely ask developers to copy features found on competing websites. As a result, MySpace would end up fielding several formal complaints from companies who felt their intellectual property had been infringed, including HotOrNot.com and Xanga.com. Ironic then, that they should come to feel such heat from the creative industries regarding the uploading of copyrighted material by users.

Anderson and DeWolfe decided that they would differentiate themselves from Friendster by adopting the opposite position on membership. They would, for instance, not require member email addresses to be verified, nor would they require that users be identified by their real names, and they were completely unconcerned about the existence of fake or fictional accounts. Overwhelmingly though, MySpace’s only real innovation, the only clear moment of originality amid their shameless aping of Friendster, and perhaps the biggest factor in their success, was a mistake; a happy accident. When original developer Duc Chau departed after only a month, MySpace employed two developers to migrate the entire site from Perl to ColdFusion, bringing it in line with other eUniverse sites. In the migration, the developers failed to block the inclusion of HTML, CSS and Javascript in forms submitted to the site by its users. This was a commonplace security measure on similar social sites meaning that the site owners retained full control over the visual identity of their sites.

Rather than patching the flaw, it was allowed to persist and users responded, turning “...their profiles into an explosion of animated chaos,” (Boyd, 2007) “...a jungle of clashing colors, blasting sounds, [and] lurid images.” (Hansell, 2006) A raft of secondary sites emerged as a result, providing users with the necessary code and instructions with which they could make such modifications to the appearance of their profiles. It is from this that Boyd determines the emergence of a copy/paste culture whereby users who are not technologically literate enough to make the changes themselves, could access mediating services that would, essentially, do it for them (Boyd, 2007). Not content just changing fonts or the background colour of their profile pages, users could now easily aggregate content from around the web, as if putting virtual posters on their virtual bedroom walls.

This kind of user-generated and user-curated content was what would give rise to the concept of *Web 2.0* and so began the cat and mouse game of copyright infringement and take-downs that still plague sites like YouTube, and which rankle the creative industries to this day. With MySpace we were all of a sudden in a completely new era, where the technological barriers to creating a personal presence on the web had been yet further reduced, and following which there would forever cease to be clear distinctions between “...consumption and participation, authority and amateurism, play and work, data and the network, reality and virtuality.” (Zimmer, 2008)

The sudden huge numbers of users publishing personal information, thoughts, likes and dislikes, also meant a new opportunity for data collection and analytics. Profiting from this user data would become the dominant business model for social start-ups. This was reflected in both the NewsCorp valuation of MySpace, and the eventual sale price that followed the haemorrhaging of users from the site. Facebook's recent IPO, which valued the company at a staggering USD100bn, is also testament to this, as is their recent USD1bn acquisition of Instagram. This valuation was certainly not arrived at because of any patents or IP held by Instagram that Facebook could exploit, rather that they had attracted huge numbers of users in a very short space of time. Had they wished to, any addition of further social features by Instagram would have placed the two firms in more direct competition. Despite the various apps, games, and the positioning of the network as an entertainment destination via the integration of streaming services such as Spotify and Netflix, Facebook is valuable because it has more users than anyone else and it harvests a huge amount of data and intelligence from them, not just as they log in and check their friends walls and status updates, but as they navigate any page on the web that chooses to include Facebook social plugins. Make no mistake: social networking is a never ending market research survey, with benefits, where the questions are disguised as opportunities to connect, engage, or share.

What is interesting about user behaviour in migrating away from the comparatively tightly controlled environment of Friendster to the near free-for-all of MySpace, is that they would eventually come full circle so soon by adopting Facebook *en masse*.[12] Facebook saw a return to Friendster's requirement that users register using their real identity and offered users no customisation or personalisation options whatsoever. What remains consistent throughout though — from Friendster to Facebook — is the complex of mechanisms of exchange and reward that are essentially anchored around how much you give — and frequently this equates to the divulging of personal information — to the network. Whether it's by means of number of friends, comments, likes, pokes, or retweets, popularity and influence is tied to an individual's activity. As an example, the social network for professionals, LinkedIn, aggregates the various activity of its users and provides weekly charts of top influencers'; the concern here is in conflating influence with authority, or allowing influence to supplant achievement. The complexity of power relations within such a diverse, expansive and active network is hard to comprehend, and is a constantly moving, shifting and evolving target of investigation.

If one were to carry out an associative exercise on the word "MySpace", music might reasonably be expected to figure quite highly among responses. Some may then, find it curious to find that music wasn't an intrinsic part of the MySpace plan, rather a response to the fact that it wasn't the overnight success its creators thought it might be. When initial growth was slow, DeWolfe and Anderson again they found their answer in fashioning a feature as a relief of existing Friendster policy: bands and music. As Anderson recollected, "On Friendster, if you were a band and you made a profile, they would delete it. They didn't want bands on their site." (as quoted in Pace, 2006) The pair were savvy enough to realise that the record labels — growing increasingly concerned about piracy and declining sales — were signing fewer acts, for less money and giving them less time to develop. MySpace would get its numbers by giving musicians, bands and DJs a platform upon which they could promote their music. By March 2004 MySpace had some 5,000 bands and 1.2 million registered users. Bands making use of the site ranged from household names to the completely unheard of, and everywhere in between.

[12] Facebook overtakes MySpace in number of unique monthly visitors globally in April 2008 (ComScore as quoted by TechCrunch http://goo.gl/Wc3zd), and in the US in May 2009 (ComScore as quoted by TechCrunch http://goo.gl/j4V8M)

While its growing reputation as a music discovery site and promotional tool for bands would continue to propel its growth — attractive as it also was for non-musical users of the site, who would include artist songs on their profile pages — the real impact of the service on the music industry is tantalisingly difficult to determine. There were the failed attempts to sell music to MySpace users. First, by creating a marketplace for unsigned acts to sell their music directly to the listener (or at least slightly more directly, MySpace would take a sizeable 45% chunk of revenue from sales, albeit not quite as much as a label might extract from a traditional recording contract). Second, in attempting to position itself as a rival to the dominant iTunes service from Apple (for which it enjoyed the support of three of the four major record labels, with only EMI withholding support). What's for certain is that there was a lot of buzz' being generated in early 2006: buzz about artists on MySpace, and buzz about MySpace that in turn seems to have generated buzz for artists on MySpace. Myth-making is a fundamental part of the history of popular music from Robert Johnson through Dylan, Bowie, Waits and beyond. It is then — given the association with popular music — quite fitting to find that there was more than just a little mythologising around MySpace and its potency for finding, supporting and breaking new talent and reviving what was widely perceived to be a flagging music industry.[13]

It was frequently cited as being responsible for the signing and eventual success of a number of acts and, in a number of very high profile cases at least, this ascription was, at least partly, misplaced. British group, Arctic Monkeys, were one of those dubbed a MySpace success story' after they generated a feverish flurry of attention in the U.K. and U.S. music press. When quizzed towards the end of 2005 about the role MySpace played in their rise, the band recollected how at the time of their album achieving number one status in the U.K., coverage "...on the news and radio [was] about how MySpace has helped us... the perfect example of someone who doesn't know what the **** they're talking about. We actually had no idea what [MySpace] was." (Park, 2005) A few months later their product manager at record label Domino commented of the episode: "...the media need to make the populace join the dots... so people think that MySpace and Arctic Monkeys makes sense, even though it's not true." (Webb, 2006) To overstate the importance of MySpace is to miss the more important part of the Arctic Monkeys story and that is how their success was propelled more by their decision "...to give away their songs... on free CDs... [and] any swap or file sharing website that would have them." (Henry, 2006) Similarly, other acts, such as Lily Allen and Sandi Thom, would be revealed to have already been signed to conventional recording, publishing or management deals prior to their discovery on MySpace.' Somehow though, and in a manner that echoes the media frenzy around the Twitter Revolutions' of 2009, it was the technology — in this case, MySpace — that became the story.

It is difficult to separate out the impact of MySpace on the music buying behaviour of listeners, from that of Napster, Kazaa, BitTorrent, PirateBay et al., all of whom arose around the same time. Whatever disruptive effects MySpace's streaming music services may have had on the music industry, they were never successfully monetised and it is only now that we are seeing services emerge that satisfy both the industry and copyright holders in terms of safeguards and security, while offering users sufficient choice and at a price point that means they are being more widely adopted. While the case brought against MySpace by Universal in 2006 for hosting copyright infringing material is significant, three of the four major labels were eventually coaxed into an agreement with the service to sell music from their artists. It seems that the greatest

[13] While there would be little argument about the impact on compact disc sales, studies have shown that the music industry as a whole responded to the advent of MySpace, Napster and other P2P file-sharing with overall growth:
http://www.prsformusic.com/creators/news/research/Documents/Economic%20Insight%2020%20web.pdf
http://arstechnica.com/tech-policy/news/2010/04/piracy-problems-music-industry-grew-in-13-markets-in-2009.ars

enthusiasm was from eager artists and the music press and that, once all is considered, it may simply have been the case — as was remarked of the Sandi Thom episode — that "...the story created the story..." (Paul Scaife, MD, Record of the Day, as quoted in Gibson, 2006) and to everyone's advantage: both MySpace and those acts seeking fame or who were deemed to have owed it some substantial debt for making them a success. The area in which the industry made its most enthusiastic embrace of MySpace as a platform was as a promotional tool: another media channel that could be manipulated by street teams, just as radio phone-ins, discussion forums and message boards had been before it.[14]

MySpace was quickly popular with teenagers and launched without any means of verifying the stated ages of those signing up to the service. The upshot of this was that it was not long before MySpace was dealing with complaints from parents, schools were blocking access to the site (Anderson 2006) and they were facing a rising tide of media concern about child safety. An MSNBC report in April 2005 found that there were a number of child users who were lying about their age, with "...kids who say they are 16 later [stating] in their personal descriptions that they are younger." (Sullivan, 2005) There followed, some high profile cases involving under 16s and MySpace. First, a 16-year-old Michigan teenager was intercepted in Jordan after her parents reported her missing, on her way to marry a West Bank resident she had met through the site. (A.P., 2006) There was also the case of a 14-year-old Texan girl who attempted to sue the site for USD30m following a claimed sexual assault by someone she had met through the site (A.P., 2006). It already restricted the publicly viewable information of 14 and 15 year olds (minimum age for membership being 13), but MySpace had to swiftly make further amends to demonstrate that it was serious about protecting younger users, making it more difficult for those over 18 to befriend under 16s. (BBC News, 2006) The U.S. government adopted a legislative response to the growing media clamour around MySpace, when, arguably, the reality was "...less archetypically frightening than the publicity about these crimes suggests." (Wolak et al., 2008)

The Deleting Online Predators Act was proposed by Representative Mike Fitzpatrick in May of 2006. It was widely felt that the terms as defined under Section 2C of the bill, were far too broad and prompted widespread concern regarding the possible implications for schools, libraries and others providing internet services to young persons, in addition to possible infringement on the first amendment rights of both registered sexual offenders and minors. The bill defined social networking as any website that allowed users to "create web pages or profiles that provide information about themselves and [which] are available to other users", and which offers "...a mechanism for communication with other users, such as a forum, chat room, email or instant messenger." (Library of Congress, 2006) Despite widespread opposition, the bill was passed in July and stands as one in a succession of knee-jerk legislative responses — along with the 1996 Communications Decency Act and the 1998 Child Online Protection Act[15] — that ran roughshod over freedom of expression in an attempt to address hysteria around particular technologies and emerging media.

Social networking is now entirely ubiquitous. We are past the tipping point where beyond it is considerably more noteworthy to not have a Twitter or Facebook account. We are, as Dana Boyd has coined it, operating as individuals within "networked publics," (Boyd, 2007) where the seemingly informal and irreverent is now anything but temporary. Our flippant transgressions are cast, if not in quite stone, then at least in a medium of indeterminable longevity: persistent,

[14] This was also true for other content industries, most notably film, where MySpace profiles were created to promote and publicise upcoming Hollywood blockbusters, and which would frequently contain MySpace exclusives such as advance trailers, interviews, competitions and the suchlike.

[15] Which, though a U.S law, had reach beyond its borders for foreign owned sites targeted at U.S. children.

searchable, replicable, and accessible, often in ways beyond our control, to an invisible and unknowable audience. What continues today with Facebook, began in earnest with MySpace.

CASE #07 — Re-evaluating the Revolution

The western news media has fallen head over heels in love with Twitter, and it is apparent that 2009 was the year in which the romance truly blossomed. Where Twitter had featured in just 62 newspaper headlines in 2008, it rose dramatically to 1448 in 2009. This would double in 2011 to 3308 and, to the end of April 2012, it had featured in 1393 headlines, on course for more than four thousand by year end.[16] So it is then, that the news media fascination with the micro-blogging service that began in 2009 looks very much set to continue. Receiving significant attention, and accounting for some 8% of the Twitter headlines in 2009, were two events in countries both experiencing rising political tensions.

On 6th April 2009 the ruling Party of Communists of the Republic of Moldova were returned to government, following elections, in Europe's poorest country, that were marred by "...pressure, intimidation and criminal cases initiated by law enforcement agencies against opposition candidates." (Mikko, 2009) Baroness Emma Nicholson, one of 280 international observers present in Moldova for the elections, observed crowds of men and women along the Transdniestrian border who, having attempted to travel by bus into Moldova to vote, were prevented from doing so. They were "....video-taped, [had] their papers taken from them and... were warned that they might lose their jobs." (Nicholson, 2009) The following day, protesters occupied the parliament building in Chisinau to demonstrate against what they perceived to be unfair and corrupt electoral practices. Opposition leaders were quick to come out in support of the protests, with the Liberal Democrat leader Vlad Filat declaring the Communist victory a case of "...rude election fraud." (BBC, 2009) By July, and following repeat elections, the Communists were finally ousted, to be replaced by a fragile coalition of the four major opposition parties that, to this day, is struggling to reform the machinery of government. (Smolar, 2012)

Two months later, on 13 June, Mahmoud Ahmadinejad was re-elected to a second term as Iranian President. When two-thirds of ballots had been counted, the Iranian electoral commission declared that Mr Ahmadinejad had achieved a clear majority, securing some 63.8% of the vote. The announcement shocked both supporters of opposition candidate Mir Hossein Mousavi and the wider international community, many of whom were hopeful for regime change given the pre-election polling and mood across the nation. Following the close of polls Mr Mousavi, so confident of victory, had told Al Jazeera that he expected to be"...the winner of this election by a substantial margin." (Aljazeera.com, 2009) The election had marked a high-watermark in Iran in terms of voter turnout, with polling stations extending their opening by two hours to accommodate the huge queues of voters that assembled. The election result was expected to have been much tighter, with both men neck and neck as they approached polling day. The result gave rise to immediate civil unrest as Mousavi's supporters took to the streets in their hundreds of thousands. The regime was ruthless in dealing with the protests, and many civilians were killed or injured.

Both electoral controversies received wide coverage across western news media. Social media featured prominently in reporting, to the point where the events in Moldova and Iran would become known as the Twitter Revolutions.' Headlines online and in print, were emphatic: "*Russia Furious with EU Over Twitter Revolution*," (Independent) "*Students Use Twitter to Storm Presidency in Moldova*," (The Telegraph) "*The Twitter Crisis: How Site Became Voice of Resistance*," (The Guardian) "*Twitter Ripped the Veil off The Other,"* (The Sunday Times) "*Twitter on the Barricades in Iran*," (New York Times) and "*The Tweet that Shook the World*"

[16] Results retrieved from NexisU.K. search of Major World Newspapers (English), excluding newswires and with high similarity articles filtered from results.

(Observer) being just a few examples. There was nary a breath of hesitation in ascribing the instrumentality of the social networking platform in the organisation of political unrest in both these cases. So convincing was the media portrayal that soon enough U.S. State Department officials were requesting re-scheduling of maintenance in order to keep the service online, (Musgrove, 2009) and former national security advisers were doling out their recommendations for a Nobel Peace Prize. (Pfeifle, 2009)

The upshot of this was that, for all the eulogising about Twitter, there was virtually no mention made of the protestors' use of Russian language social media site, Vkontakte, in the reporting of the Moldovan protests and, similarly, little room for discussion of the role played by Balatarin, Donbaleh or Sabzlink by Iranian protestors. Nor, as was noted by journalist Golnaz Esfandiari, did anyone reporting at the time think to stop and ask why it might be that "people trying to coordinate protests in Iran would be writing in any language other than Farsi." (Esfandiari, 2010) Facebook and YouTube received honourable mentions, but nothing like the coverage that was afforded Twitter.[17] Sreberny commented that the role of social media had been overplayed and that, in a country where mobile phone ownership was 75% yet there were less than 10,000 (Schectman, 2009) Twitter users, it was hard to "...argue that social media really mobilised Iranians themselves [rather] the protests were best organised using SMS." (Weaver, 2010)

When Malcolm Gladwell's piece, "*Why The Revolution Will Not Be Tweeted,*" was published in The New Yorker on 4 October 2010 it ignited a fierce debate that raged for months. Gladwell's piece attacked the weak ties' (Granovetter, 1973) inherent to social networks and what he saw as the easy nature of net activism — slacktivism' or clicktivism so-called for demanding little more than a click of the mouse as a minimum requirement for participation — and compared this unfavourably with real-world activism as evidenced by the Greensboro student demonstrations, which had sparked a wave of civil rights protests across the United States in the 1960's. Gladwell highlighted what he saw as the inherent weakness of social networks for coordinating and affecting social and political activism: the absence of both structural hierarchy and the clarity of direction that comes from having a designated leadership. In retrospect, it seems as though Gladwell's ire was raised by something of a straw-man: of the many hyperbolic headlines that appeared, most were either wholly or in greater part unrepresentative of the content of the articles to which they were prelude. Few, if indeed any, were those journalists and commentators who argued Twitter as sole cause of the Moldovan or Iranian revolutions, or who failed to recognise the direct action that occurred in the streets of Chisinau or Tehran. As has long been the case: newspapers don't sell themselves.

The debate surrounding the Gladwell piece polarised and became something of a face-off between, on one side, techno-utopians desperate to affirm the revolutionary credentials of Twitter, Facebook et al, and on the other, various sceptics lined up to defend Gladwell's interpretation of events; with Jay Rosen among the few providing dispassionate and considered commentary amid the furious flurry (Rosen, 2011). Sadly — and somewhat ironically given the varied geography of its subjects and the global implications that these events have had — the debate around Gladwell's provocative article looks, in retrospect, like a particularly western media feeding frenzy. Oddly, Gladwell would eventually revise his position, following the events that would unfold in Tunisia and Egypt through early 2011, and said of the matter: "...my article was written back in the summer well before this happened. I've been as dumbstruck as everybody else by what's happened in the Middle East." (CNN) Twitter featured prominently in

[17] Admittedly, Twitter has proved harder to prevent access to on a technical level by virtue of it's SMS integration, but Facebook was, for example, used by all presidential candidates in the run-up to Iranian elections.

western reports of events in these countries also, and both received frequent mentions throughout the reporting on the events of the Arab Spring.'

Objectively establishing the extent to which the new social media platforms influenced and impacted the direction of events across the Middle East in 2009-11 deserves a depth of inquiry beyond the scope of this article, but the type of which is now appearing. The investigations of Danah Boyd and colleagues on the information flows on Twitter during the Tunisian and Egyptian uprisings (Lotan and Graeff et al., 2011) are illuminating and, crucially, are based upon the kind of rigorous quantitative analysis that social networking tools such as Facebook and Twitter, with their open APIs and easily accessible gigabytes of data make possible. Similarly, Sreberny and Khiabany have demonstrated that the Iranian blogosphere was a far more nuanced and contested political space than the oversimplified site-of-resistance, which was projected by western news media in the immediate aftermath of the election. (Sreberny and Khiabany, 2010) What perhaps is worth considering are those questions less frequently addressed in and around these political uprisings, because there is arguably much more to be gleaned from them than just whether Twitter can or cannot be a useful or effective tool in giving voice to protest.

It was observed at the time that the frequent citation of Twitter, twitterers and their tweets might be explained by the fact that "...the international media [didn't] have its members on the ground." (Schectman, 2009) It is clear, in the U.K. at least, that there has been a steady decline in the number of foreign correspondents — and subsequently the volume of international reporting — over the past twenty years (Moore, 2010). This new dependency on social media and citizen journalists to provide front-line information, in combination with the pressure brought to bear upon news organisations by the demands of a 24hr news culture and the relentless churn of Twitter itself, creates a perfect environment for inaccuracies and rumour to spread. Of this, Hamid Tehrani, the Persian editor of the blogging network Global Voices, said "...someone tweeted that there were 700,000 people demonstrating in front of a mosque, it turned out that only around 7,000 people showed up" (Weaver, 2010). How best for news media to establish the veracity of sources in this emerging era of social media and citizen journalism?

What do the Twitter revolutions tell us about the nexus between old and new media? When protesters were filming footage on mobile phones and uploading it to YouTube and/or Facebook, however many views these clips may have received online, it was still nothing compared to the exposure they received when they were picked up and syndicated across TV news channels. Boyd et al. have demonstrated the persistence and prominence of mainstream media sources in information flows on Twitter during the protests in Tunisia and Egypt, which indicates that their position as an authoritative voice has yet to be usurped by the citizen journalist. (Lotan and Graeff et al, 2011) The intended audience for the, mainly, English language tweets that were coming from in/outside these countries seems unquestionably to have been international media. Old media, in this case, was the amplifying technology.

If we are looking at social media as a new platform for civic engagement, for political participation, and as tools to facilitate resistance and/or protest, then perhaps their private ownership and for-profit status needs more careful consideration. While Twitter co-founder, Biz Stone, wrote an impassioned rebuttal of Gladwell's article and Twitter complied with the U.S. State Department requests to delay technical updates that would have taken the service offline at a crucial time, would they have otherwise? Their services are used daily, unquestioningly, but what trust is there in these corporations to be impartial and healthily apolitical, and yet, crucially, ethical? Vodafone found itself embroiled in a public relations nightmare after ad agency JWT leaked an ad on their website that the firm had commissioned. Though JWT quickly removed

the ad from their site it is still available to view (Dailymotion.com, 2011), and depicts Vodafone claiming credit for the Egyptian revolution. In it, the launch of a previous ad campaign is detailed before the following is flashed up on screen: “3 days later, 100,000 hits and 500,000 fans on Facebook... 3 weeks later, January 25th 2011...”, a voiceover then chimes in declaring Mubarak’s decision to relinquish the presidency. The ad was widely criticised, including by Google executive and prominent activist, Wael Ghonim, who comments and likeness were used in the ad without prior authorisation. (Ghonim, 2011) Ironically enough, this followed the firm’s prior compliance with government requests to limit mobile services (Telegraph, 2011), and to distribute pro-government SMS to its users. (Wheatley, 2011)

Following the London riots in August 2011, the U.K. government announced that Home Secretary, Theresa May, would be holding meetings with Facebook, Twitter and Research In Motion (RIM, the makers of Blackberry, whose messenger service was at the forefront of reporting during the riots). The Prime Minister, David Cameron, addressed the House of Commons and indicated that there would be a social media clampdown and, potentially, new powers for police and intelligence services. (BBC, 2011) It was widely felt that his reaction was ill informed and ill considered, prompting one journalist to quip that although no mention had been made of Google+ or Linked in relation to the riots that “...perhaps we shouldn’t rule anything out.” (Bradshaw, 2011) RIM had their website defaced by U.K. hackers following their perceived rush to assist the police during the riots. (BBC, 2011) Curiously, the firm had been at loggerheads with the Indian government for sometime during 2008, for similar requests for access to user data, about which they finally acquiesced. (Economic Times, 2008)

The openness of platforms like Twitter, that in the first place enable them to be useful to users wishing to quickly and easily reach a wide audience, and the mechanisms it provides for organising comment around a subject are easily misappropriated. The now defunct U.K. furniture retailer, Habitat, was widely criticised for its spamming of the Iranian events on Twitter, having posted such tweets as: “#MOUSAVI Join the database for free to win a £1,000 gift card.” (BBC, 2009) Though the company were swift to apologise, and attributed the tweets to an over-zealous intern, the example highlights the ease with which issues can be hijacked for unethical or nefarious purposes on these social platforms. Flogging furniture is one thing, but what about the potential for deliberate misinformation by regimes seeking to defend themselves?

The episodes of Moldova, Iran and the events of the Arab Spring that followed in early 2011 are rich examples of the disruptive nature of internet technologies, social networking, and Twitter in particular — even if only in the manner in which it came to frame so much of the discussion around these monumental events, without any clarity about its real impact. Morozov observes that the overbaked claims of the western media may have succeeded only in ensuring that these digital spaces are now “...watched with more rigor and intensity than anti-government gatherings in physical spaces.” (Morozov, 2011: 235) Additionally, these events have as much to tell us about the shifting relationships between new and old media, the changing role of journalism, and the power exerted by corporates and governments over freedom of expression, as they do about the potential for social networks as enablers for political engagement and action. Once again, they also shine a light on the U.S.’ firm hold over the web: the fact that the U.S. State Department can intervene to keep Twitter up and running in order to influence events in another country should not be overlooked. The myriad questions these events raise in respect of these areas should ensure that the Twitter Revolutions’ are remembered for more in the west than just the fetishistic media frenzy they created.

Reflections on Cases

The journey from NCSA at the University of Illinois to Tahrir Square in Cairo is a long one. Since 1993 we have seen huge growth on the internet that has both widened access to information and education for users, created a wealth of new opportunities for businesses and presented a succession of challenges to governments. It is a journey scattered with examples of inherently disruptive innovations of a type that we might well now consider to be hallmarks of the internet but one which is equally battle-scarred as a result of various efforts to legislate, regulate and restrict it. Today, the financial storm in the West rages on unabated, and the emergence of the next Twitter, Pinterest, or Airtime is just around the corner, no doubt to be greeted by the whoops and cheers of the technophile chorus. What our cases demonstrate, overwhelmingly, is that the inherently disruptive technology of the internet will continue to deliver the unexpected, and so it is that we leave any predictions about the future of the web for the snake oil salesmen. Nevertheless, the developments we have examined in this paper have identified a number of considerations that we should continue to be mindful of as the web moves forward.

In 1993, Mosaic unlocked the true potential of Berners-Lee's world wide web and also captured the public imagination. It was the beginning of a steep growth curve that would accelerate through the '90's and which continues to grow today, as our expectations of 'anytime access' bring connectivity to an ever greater number of devices. Mosaic did successfully bring together the key features from other competing browsers. Ultimately though, it succeeded for two key reasons that can be seen as heralds of significant tropes for the burgeoning internet: free and easy. In distributing the browser as free for non-commercial, personal-use and by rationalising the installation method so that it was accessible to non-technical users, NCSA gave Mosaic the best possible chance of being widely adopted, and simultaneously established an expectation among users and a model for businesses that would have far reaching implications for the web. The case of Mosaic also highlights a number of early issues around internet governance. Having first funded ARPANET and then NSFNet, the U.S. government would have a defining influence over the web for many years, even though WWW itself had originated with Berners-Lee at CERN. The rapid growth in numbers that Mosaic brought to the web shone a spotlight on the effective monopoly that had been granted to NSI. ICANN assumed responsibility in 1998, but only for similar questions to remain. Mosaic was the catalyst for users, businesses and governments to begin exploring the possibilities of the new global networked environment. Their early interactions in this period highlighted the necessity for some formal structures of internet governance, as would eventually be defined by the World Summit on the Information Society (WSIS, 2005) as the "...development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet." The U.S. would hang onto effective control of the internet for many years and we are now, finally, seeing the internationalisation of internet governance in a meaningful way.

The online marketplace that we take for granted today sits atop a foundation of browser technologies from the mid-1990s, particularly SSL as developed by Mosaic creator Marc Andreessen. Thanks to this bedrock, Amazon and eBay have become trusted and established internet brands that boast millions of users and billions of dollars in turnover. Their journey from start-ups to online behemoths involved the development and refinement of an online shopping model which successfully replicates the security and familiarity of the high-street experience, while leveraging the benefits of new internet technologies to offer both greater choice and convenience for the consumer. From secure payment systems to innovative methods of

recommendation and referral, these companies led others in delivering choice across borders and vastly expanding the types of goods that could be purchased, and the destinations from where they could be sourced. They would also be in a position to collect more information about their customers than retailers had ever managed before.

Along the way, Amazon's ambitions have expanded considerably, and they have taken no prisoners in pursuing them. Today it holds a significant and growing share in markets that, until recently, were dominated by booksellers, record stores, electronics and clothing retailers, alongside other bricks and mortar stores. It sits at the top table of the internet, alongside giants such as Google, Facebook and Apple. Among the many to whom its growth has caused alarm are the major print publishers, who have been prompted to take what appears to be, extreme action in order to protect their businesses. Hachette Livre, HarperCollins, Simon & Schuster, and Penguin (Pearson) are among those that now stand accused, along with Apple, of collusion with respect to the price fixing of ebooks. Amazon's dominance in the emerging ebook market casts a heavy shadow over the entire episode. Not content with the huge success of Kindle for e-books, Amazon has diversified the Kindle brand with the Kindle Fire, now placing itself in direct competition with Apple, Samsung and others for a slice of the tablet market. With Amazon Prime Instant Streaming, the recent acquisition of U.K. DVD and online TV and movie rental service LoveFilm (Bradshaw and Birchall, 2012), and the announcement that it will commission original TV content through Amazon Studios (Mangalindan, 2012), it is clear that the company is also making moves to see off the likes of Netflix and Hulu, and make a serious challenge to Apple's bid to own the living room. One thing is clear: at the same time it makes its customers feel secure in their shopping, Amazon makes its competitors exceedingly nervous. The traditional high-volume bricks and mortar U.S. retailer, Wal-Mart, has faced relentless criticism and a litany of controversies over its business practices, and raised many a concerned voice over its impact on the 'main streets' of the U.S. By comparison, Amazon is a company that operates truly globally, only planting their feet where absolutely necessary — and, of course, wherever is most tax efficient — and which shows no signs of slowing in either growth or its efforts to diversify. The only reasonable expectation should be criticism and controversies of an order of magnitude that dwarf those faced by Walmart and kin thus far.

While e-commerce grows ever larger we are simultaneously seeing further support for smaller and smaller value transactions, for both physical and digital goods. This rise in micropayments has the potential to further disrupt traditional markets. Services such as social micropayment system Flattr, crowdsourced funding platforms like Kickstarter, or micro-loans agents like Kiva stand to revolutionise, not only the way we shop, but also the way we ascribe value to content on the internet and more generally. The extent to which consumers' browsing and shopping habits are monitored now means that vendors know more about us than ever before, and there are significant questions regarding what happens to this information. For instance, user data can be sold to third parties, retained and analysed to build up ever more detailed user profiles, or can be targeted by hackers, stolen and used to commit fraud — as in the recent case that affected 2.2m users of Sony's Playstation Network (PSN), during which hackers exposed users credit card details. Just what redress internet shoppers have when things go wrong with their personal details is also open to question. Sony PSN customers, for example, couldn't move to Xbox Live without abandoning their existing investment in the Sony platform and incurring some considerable costs. Many were trapped in a walled garden that they no longer trusted as being secure or safe.

Buying into walled gardens in a limited way as a consumer, as above, is one thing. To exist in a walled garden of information is quite another, about which there has been growing concern in recent years and with one particular company as its focus. In fifteen years, Google has grown

from garage to gargantuan. It provides answers to some 90% of all search queries and is arguably now the single most important company on the web. But for all its successes, for all the innovative services it has bestowed upon the web and made available to users, businesses and governments, Google has proved one thing above all: the web works because of advertising. Ken McCarthy's 1994 prediction of the eventual dominance of marketers and advertisers on the internet, now looks extraordinarily prescient. And so it is, that for all the money at its disposal, and for all the incredible talent among its ranks, Google is seemingly unable to carve a significant revenue stream outside of AdWords. More generally, the dominance of ad-supported business models for internet companies has given rise to a cat-and-mouse game whereby privacy policy breaches are followed by punitive measures from governments and regulators, which only serves to conjure up images of pea shooters and heavy armour. How do we unshackle the web from the yoke of advertising? This is where we need our brightest and best to focus their attention: harvesting user data for advertisers and marketers should be just one of multiple ways for businesses to provide profitable, sustainable, innovative web services. We need a new generation of start-ups that are prepared to meet this challenge, who want to create businesses that do more than cultivate marketing fodder for advertisers, who are prepared to respect the rights of users as a first principle, and who aim higher than just an IPO or lucrative takeover.

As users, we have to more effectively realise our agency as citizens of the web. The establishment of free-as-first-preference on the web that started with Mosaic, and continued through Google, Napster, MySpace, Twitter and countless others arguably this has to stop, at least in its current guise. Contracts, and make no mistake this is what those T&Cs are, are drafted at great expense and designed to be legally bulletproof, not to protect the end user, but to protect the interests of the issuing company. While this is nothing new, what has changed is the frequency with which we now encounter and enter into legally binding contracts. It was not so long ago that contracts existed only around the milestone events of one's life: on commencing employment, applying for a bank loan or credit card, on the occasion of marriage, or buying a house. By virtue of their infrequency we treated contracts respectfully, fearfully even, and, for most of us at least, we would give each its due consideration before signing and agreeing to the terms they held. By increasing the frequency with which we are presented with T&Cs, the internet has debased the seriousness of contractual obligations between parties, at least in context of the internet itself. For the most part, we feel sufficiently removed from the implications of these contracts that they simply do not exist for us. We are flies in honey and, having gorged ourselves on the wealth of apparently free services, it may now be that we are stuck. We have collectively failed to grasp the implications of what are very simple mechanisms of exchange: providers — about whom we often know very little — give us access to services in exchange for a limited transfer of rights over our personal data. How limited is anyone's guess. What can they can do with it, where will it end up, and to what end? We have little understanding about what we are actually signing over, and even less about what the implications of that might be, though we may be slowly waking up to it.

Certainly, businesses are satisfied with arrangements as they are, and can be expected to keep pushing services to users, eager to sign-up for whatever is this week's new Evernote/Instagram/Pinterest/Tumblr. There is perhaps hope though, in that someone might eventually respond to meet demand, whether it is established businesses or newcomers. What EMI or Fox couldn't work out, Spotify and Netflix eventually did. It is perhaps then incumbent upon us to demonstrate that we want another web and perhaps that we are prepared to pay for it. This is a considerable challenge, akin to the proverbial turning of the tanker. The idea of paying for intangible products and services — and by this we mean those that can be delivered in bits and bytes over the web — runs contra to the behavioural norms that have established

themselves since the advent of Napster. In the eyes of some observers, the decade long spree of free has devalued cultural output irreparably by creating a generation of users who refuse to pay for digital music or movies. How to reconcile our new expectations when buying online cultural products will be a crucial feature of the web's development in its third decade.

What the Napster story demonstrates most clearly is the inability of both the established entertainment industry and governments to understand technology. P2P and BitTorrent protocols made the sharing of content — intellectual property — across borders so simple that it almost immediately rendered the concept of copyright irrelevant. What was previously difficult to rip, replicate or remix suddenly became easy and free, leading the recorded music industry to spend millions of dollars in the U.S. suing its own customers — ironically enough, the very people who, time and time again, would be shown to be among their very best customers (Borland 2002; BBC 2005; Masnick 2011b; Doctorow 2012). They have spent similar amounts, with similarly little effect, in lobbying governments to protect their old business models. The net effect in both instances has been the same, and while technology continues to reliably outpace copyright law there is no reason to think this should change. Despite the global success of Apple's iTunes, Amazon's mp3 store or Netflix, there has been a fundamental failure to address the complete irrelevance of regional markets in the internet age, and we are sadly no closer to doing away with regional release dates or technical protection measures that restrict content to regions. There are no technical reasons why a global marketplace for goods is not possible, only legislative or political ones. Internet users instinctively understand this; giant companies who got rich off of divide and conquer tactics instinctively shy away from it. This, when combined with the often laughable claims produced by the entertainment industry and their advocates on the effects of piracy, appears to have reduced the legitimacy of these companies in the eyes of consumers who, in many cases, simply want to purchase content they are told they cannot have.

The implications of this situation could be far-reaching. If the big entertainment companies have their way there will be greater restrictions on the use and re-use of digital content by the artists and creators of tomorrow, and legislative overreach that could threaten services such as YouTube, Facebook or Reddit today, and also stifle the emergence of their future successors. Less likely, though still of some concern, is that poorly-drafted copyright legislation might lead to fundamental changes in the internet's architecture in order to restrict access to certain websites, something that will undoubtedly contribute to an awkward standoff in terms of technologies to facilitate and evade detection online. At a time when a talented teenager can circumvent any of the technical roadblocks put in place by governments, the wisdom of continuing to drive potential consumers underground to a world of torrent sites, cyberlockers and freenets must be questioned. Alternatively, it could turn out that copyright is really this generation's prohibition, and the post-Napster period will ultimately lead to a rejection of an outdated concept and a new wave of innovation, new social norms on creation and sharing, and far less influence for giant entertainment corporations. However, if this is to happen then copyright frameworks are going to be have to be redrawn to reflect the global nature of the internet — and the appetite among policy makers for doing this is not yet evident. The emergence of a two-lane Internet — one for those who know how to use all that internet technologies have to offer, and one for those in the legally constricted slow lane — is now a real possibility.

When considering a two-lane internet let us not forget that for many of the world's users, it is already here. Our paper has mainly concentrated on the influence that the U.S. and major U.S. companies have had on the internet's development, but the case of China's Great Firewall draws our attention to the information inequality that exists in large swathes of the rest of the world as a result of governments censoring websites or monitoring internet use. While avoiding

detection to download the latest Lady Gaga single is difficult to paint as heroic, avoiding detection to post details of an illegal protest is a far braver deed — and in the world's most repressive internet regimes the consequences for doing so can far outweigh what the RIAA or MPAA can possibly impose.

The rise of internet censorship and surveillance detailed in our case study is unlikely to come as a surprise to future students of history. Nation states have always shown a tendency to monitor their populations, and the internet is merely another tool to help them hoover up vast amounts of information. The net effect of increased surveillance is, in nearly all states that remain at least partly open to the wider world, likely to be either passive citizen resentment, or active resistance that takes advantage of all that online technologies offer. What makes the situation a heady mix in the 21st century however, is the extent to which private companies are providing technologies to facilitate surveillance, or collecting information on their users that governments may find useful to access at a later date. This intermingling of the private sector with the public, with the aim of uncovering private information, has seen the Iranian government use Nokia's technology to monitor their own citizens in the Green Revolution, or the Egyptian Government forcing Vodafone to send its subscribers anti-revolution messages during the Arab Spring. The vast amounts of information now being collected in the digital age, whether it is volunteered publicly on social networking sites, or stored privately in the cloud by third parties, is of tremendous interest to all governments whether they are in pursuit of terrorists, revolutionaries or common-or-garden criminals. How to get at this information is the trick they are desperate to pull, and every year sees more purported anti-terror legislation that tries to open up back doors to social networks or VOIP services.

At the heart of this is the issue of control — can anyone ever win this battle in the face of the disruptive technology now at the disposal of over two billion people on the planet? Maybe not, but that won't stop the world's giant institutions trying. 'Civilising' the internet, a la Nicolas Sarkozy, means subjecting its users to the same degree of regulation that exists offline. For Russia and China, making the internet civilised means having control of what information can and cannot be seen and spread by users, and choking off the types of online discourse that could create trouble for the country's rulers. The U.S. dominance of the internet's backbone institutions, such as ICANN, is viewed warily from those outside of the west, and any opportunity, such as the World Conference on International Telecommunications (WCIT) in December 2012, will be taken to try to grab back some sort of control of what is, after all, a most dangerous medium for non-democratic regimes. On the other hand, it is very much open to question just how much the internet can really be controlled, and user awareness of the extent to which governments can monitor is rising, with tools such as TOR or anonymising VPNs becoming more commonplace. The transparency movement, whether led by Wikileaks or the hackers of Anonymous, also continues to grow, and no less a person than Tim Berners-Lee has urged users to take back control of their personal data from Google and Facebook. Expect the continuation of a high-stakes arms race in the near future, and even the prospect of 'internets', as famously mis-spoken by George W. Bush - governments shutting themselves off from the wider internet, in an effort to 'do a China', or even increasing amounts of 'cyber warfare' to defend one's turf or exploit another's. For every advance that diverts the flows of bits and bytes — whether they be carrying music, movies or leaked documents that could bring down a regime — in new, unexpected directions, there will be a counter-measure in the form of legislation, subterfuge, or even plain old repression that comes with a knock on the door in the middle of the night. The struggle for control will continue and while those who understand the technology of anonymity may be able to watch from the sidelines, a substantial portion of the world's internet users may well end up being 'civilised' in ways they may eventually find uncomfortable.

On the flipside, anyone that doubts that, given certain circumstances, users have the power to influence and change the web need only look at the volte face that wiped millions off the value of, first Friendster, and then MySpace. Herd-like sudden migrations were the ruin of both companies and their rise and fall stand as testament to the volatility of any social business venture on the web. Facebook may currently reign supreme but regardless of how permanent a feature it may appear to be today, it will itself eventually fall victim to some as yet unknown plucky newcomer if, that is, it doesn't first fall victim to what seems to have been a gross mis-valuation in its recent IPO (Rushe, 2012). Despite its brief moment at the top, the fiercely enthusiastic youth membership that formed around MySpace changed social networks from niche pastimes into common sites of exchange and communication which, for many, have now replaced email as their primary means of electronic communication. As a result, previous distinctions between the public and private spheres have been completely and irrevocably reconfigured. Collectively, we've thrown ourselves into social networking with the same kind of enthusiasm a cash-strapped student might muster for a paid psychological experiment, and without having first found out what the test is, how long it might last, what the risks might be, or how much we might get paid for it. The present is produced, published and preserved for posterity in the same moment. We have numerous services to satisfy our whims as consumers and our aspirations as authors, yet we remain unable to publicly fund a true digital library; a comprehensive common holding of recognised knowledge. No Library of Utopia for us, not just yet (Singer, 2012).

We are instead facing considerable philosophical questions that require an informed public discussion, with the broadest participation possible, to debate the information that is collected about us, by whom, and to decide what can and should be done with it. Businesses would love to be able to build up whole-life profiles of users — see Google's recent U.K. advertising campaign as brazen evidence of this — to be able to hone their predictions of user behaviours and anticipate habits before they have formed. Similarly governments — more febrile than ever post-9/11 — also need little encouragement that more data is inherently good, for those who govern at least. However, it is arguably of equal importance to the development and evolution of both ourselves and our societies that we forget. The ever falling costs of data storage threaten a tyranny of abundance: we can, so why not? There are things we should remember and those we should forget, some to be preserved and those best discarded, and the value is as much in the choosing as anything. None of us will live forever, but our personal data — our thoughts, feelings, likes and dislikes — just might and we could have very little say in the matter.

The EU's pursuit of a 'Right to Privacy' roused a number of voices recently, many of whom were quick to decry it as impractical and unworkable. Whatever transpires with regards to that, there is still room for another solution. Privacy, as Cory Doctorow has recently pointed out, is a business opportunity (Brewster, 2012) and it is entirely possible that DuckDuckGo may be the first in a coming wave of alternative providers, offering familiar services but differentiating themselves on the basis of their privacy and data preservation policies. 24hr tweets? A finite Facebook? It may not be our existing providers that venture there and, perhaps, even if it were there would be certain brand contamination issues that would have to be surmounted, but it will happen. It may not prove popular with governments, it may not entice marketers or advertisers in the same way Google or Facebook do, but it will appeal to users who, having seen a generation above them inadvertently submit themselves to a lifetime of 'managing their online brand', will wish to redefine their relationship with their online selves and reclaim a little of their souls in the process.

Several of our case studies indicate a growing relationship with the web and ancillary technologies that may not be entirely healthy. We are now technophile magpies building nests of shiny things: whether it's a new iPhone, Google Goggles, or some mythical Facebook app — the app to end all apps — there is now a vast online archive of techno-consumerism masquerading as journalism. While many of these websites are also home to some invaluable commentary on many of the meta-level issues around internet governance and user privacy developments, they do have to pay the bills and for many of them it's a question of footfall and ad-clicks. What would once have been referred to as 'info-tainment' and rigorous journalism now live side-by-side, in the technology pages at least. Traditional news media also has to make ends meet and, following year after year of falling ad revenues for their print publications, many are looking at ways of monetising their online offerings — just look at the Guardian's iPad app or the Wall Street Journal's paywall. One wonders about the coincidence of this fall in revenue and, for instance, the sharp uptick in Twitter headlines over a similar period. As newspaper proprietors migrate to the online environment, we should perhaps be concerned about the extent to which search engine optimisation (SEO) considerations could impact the veracity of our journalism.

This is not quite such a controversial suggestion when considered against the backdrop of the so-called Twitter revolutions of 2009 and the Arab Spring that later defined 2011. Together, these represented an outbreak of popular protest on a scale unseen since the wave of revolutions that followed the collapse of the Soviet Union in 1989, and the western news media were quick to characterise social media as the critical catalyst in the uprisings. Would readers have been as interested without the Twitter headlines? Sadly, perhaps not. This episode can be seen as yet another expression of the increasingly fevered and insufficiently critical enthusiasm for technology that now permeates much of western culture and its news media. The true complexity of what actually occurred is only now beginning to emerge, but it is clear that it was not quite so simple as tweets overturning governments. Through this episode we got a glimpse of the shifting relationship between traditional news media, social media and the rise of 'citizen journalism.' It also served as some indication of the damage wrought by the tyranny of the efficiency dogma: news outlets with ever falling revenues, at a loss over how to replace lost TV and print advertising revenues, scale back on international correspondents, lean more heavily on citizen journalism and overplay — irrespective of whether or not this was consciously done — the instrumentality of a western technology, such as Twitter. It is perhaps also not entirely a coincidence that this should occur as the West is reeling from the huge financial shocks of 2008, and is having to come to terms with a dramatic shift in economic influence towards the east.

All of the issues raised in this paper must now be considered against the increasing number of people on the planet who now access the internet primarily via a mobile device. There are now 1.1 billion 3G subscribers worldwide and this number is growing at 37% per year (Meeker, 2012). Many of the internet's next billion users will be entirely free from a fixed-line connection and may well view our desktop browsers as something of an anachronism. The implications of this are stunning: our mobile phone operators are the new ISPs; iOS, Android and Microsoft themselves — although somewhat late to the party — are all vying to be the Windows of the new mobile space. While their increases in the share of the traditional personal computing market have remained modest, Apple in particular, with their huge expansion into mobile courtesy of the iPhone and iPad, is clearly in a position where they will be one of the companies that defines the future of the mobile web. Because of the mobile phone's roots as a simple, single-purpose device our expectations are very different from those of the personal computer, and we have so far been accepting of new levels of control over what applications we get to use, what we get to buy, and who is able to see where we are and what we are up to. The glare from our mobile's screens may make the future seem bright, but the reality may end up being

somewhat different. We can only hope that the questions raised by our case studies continue to be asked of the coming mobile web.

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